

Hawaii ESA law because the Federal Act defines "take" as "harm" while the State law defines "take" as "injure." "Harm" and "injure" are generally synonymous. The cost of such special management should be considered prior to a final determination on the proposed designations. Where costs are likely to outweigh the benefits of the proposed designation, designation of critical habitat should be determined not to be prudent, or at a minimum, areas proposed for designation should be significantly reduced so that any special management measures that may eventually be mandated through litigation are of a scale that is reasonable and cost-effective to implement.

Another commenter expressed concerns that the proposed critical habitat would bring private party lawsuits resulting in mandated protection for critical habitat. Another commenter also stated that in Hawaii it has long been established that landowners own all feral animals on their property. The commenter expressed concerns that plaintiffs who seek to compel a private landowner to spend money to protect critical habitat could argue that the landowner has a positive obligation to ensure that such animals do not harm the habitat.

*Our Response:* Section 4(a)(3)(A) of the Act directs the Secretary to designate critical habitat to the "maximum extent prudent and determinable." Critical habitat is not prudent when one or both the following situations exist: (1) A species is threatened by taking or other human activity and identification of critical habitat would increase the degree of threat; or (2) designation would not be beneficial to the species (50 CFR 424.12(a)(1)). Thus the costs of designation are not considered in analyzing whether critical habitat is prudent. However, such costs are considered under section 4(b)(2) of the Act, which directs the Secretary to take into consideration the economic and other impacts of designation and authorizes the Secretary to exclude any area if she determines that the benefits of exclusion outweigh the benefits of designating it as critical habitat, unless it will result in extinction of the species.

The Act does not obligate landowners to manage their land to protect critical habitat, nor would landowners and managers be obligated under the Act to participate in projects to recover a species for which critical habitat has been established. However, Chapter VI, Section 4.c. of the DEA does discuss the potential mandate for conservation management pursuant to litigation and the resulting costs for the proposed

designation on Maui. In addition, Chapter VI, Section 4.f. of the DEA, discusses the potential for adverse impacts on development, including delays for additional studies and agency reviews, increased costs for environmental studies, increased risk of project denials, increased risk of costly mitigation measures, increased risk of litigation over approvals, etc. The DEA concludes that it is impossible to quantify these potential costs, because there are no known development plans within the proposed designation. Furthermore, the following factors make future development projects in the proposed critical habitat highly unlikely: (1) 86 percent of the critical habitat is in Conservation District where development is severely limited; (2) the approximately 14 percent of the critical habitat in the Agricultural District is in remote areas, areas lined with gulches or steep cliffs, or areas with limited access to water; (3) there are no known plans for development within the designation; and (4) most of the critical habitat in the Special Management Area is also within the Conservation District. While it is conceivable that there may initially be an increase in subsequent lawsuits related to the critical habitat designation, it is not possible to predict their number, degree of complexity, chance of success, or any other associated effect due to scant historical evidence for the plants.

(59) *Comment:* Several commenters were concerned that critical habitat designation will lead to unnecessary and costly litigation. Another commenter was concerned about the likelihood of private party lawsuits limiting current ranch operations.

*Our Response:* As discussed in the DEA and the Addendum, an undetermined probability exists that a Federal or State court could mandate certain indirect impacts as a result of critical habitat. However, it is beyond the scope of the economic analysis to assess the legal merits of the arguments for or against the various indirect impacts, to assess the probability that a lawsuit will be filed, and, if filed, to identify possible outcomes of a court decision and the associated probabilities. However, whenever possible, the DEA and the Addendum present the worst-case scenario of the costs associated with the potential outcomes of third party lawsuits.

(60) *Comment:* ML&P believes that designation of critical habitat would adversely impact the value of agricultural lands and lands proposed for future development, reduce the collateralized value of land holdings, and (due to State and county law)

reduce the ability to develop lands previously planned for development. The impacted lands include areas described in the proposed units A, C1, C2 and C3.

*Our Response:* As discussed above, the Service removed Units C1 and C2 and reduced Units A and C3. After this modification, less than one acre of ML&P's land in Units A and C3 remains within the designation. As such, minimal impacts are anticipated for ML&P's Agricultural land in Units A and C3.

(61) *Comment:* The Maui County Department of Water Supply provided the following information on planned projects occurring in proposed units L, G, and B2. These projects include access improvements, intake improvements, reservoir design and construction, well construction, flume repair and maintenance, water distribution system maintenance, and identification of potential sources for future groundwater. Whether these or other projects would involve Federal lands, funding, or permits, it is important that water treatment plants, sources, and collection and distribution systems can continue to be established and maintained within these areas where they are needed for hydrogeological and security reasons.

*Our Response:* Maui County and Department of Water Supply (DWS) submitted specific information regarding planned projects in the proposed critical habitat during the public comment period. Possible and planned projects include water source development in Unit B2, construction of a water reservoir adjacent to Unit L, access and intake improvements in Unit L, and repair and maintenance of existing flumes in Unit L. As noted earlier, the Service removed Unit B2 from the final designation. Thus, no section 7 costs would be anticipated to result from future DWS projects in that area. Moreover, most of the identified DWS projects in Unit L involve repair and maintenance of existing manmade features and structures, and as such, would not be subject to section 7 consultation. However, to the extent that the planned improvements go beyond repair and maintenance and would be subject to section 7 consultation due to Federal funding or permitting, the DEA's estimate of zero to two consultations reasonably reflects the potential number of section 7 consultations over the next 10 years (see Chapter VI, Section 3.k. of the DEA). The DEA estimates that the consultations can cost up to \$68,000 with project modification that can range up to \$200,000.

(62) *Comment:* Ulupalakua Ranch expressed concerns that the proposed critical habitat will: (1) Limit development of diversified agricultural operations due to the Ranch's interest in Federal cost share programs; (2) cause a loss in revenue; (3) create economic hardship resulting from increased expenses to counter trespassing caused by increased curiosity over critical habitat lands; and (4) lower economic returns and job loss due to critical habitat dividing up sections of the ranch, thus leading to inefficiency.

*Our Response:* Chapter III of the DEA notes that section 7 of the Act requires Federal agencies to consult with the Service to ensure that activities they fund, authorize, or carry out do not result in destruction or adverse modification of critical habitat. Because consultation under section 7 only applies to activities that have Federal involvement, the designation of critical habitat does not afford any additional protections for listed species with respect to strictly private activities.

Chapter VI, Section 3.g.(2) of the DEA and Section 4.e. of the Addendum present estimates of direct section 7 costs associated with participation in Federal cost-share programs with NRCS. The Addendum estimates that total consultation costs for all projects in the critical habitat designation range from \$0 to \$41,200, while project modification costs range from \$0 to \$100,000. The DEA and the Addendum both note that projects sponsored by NRCS programs are generally beneficial in nature and are likely to involve minimal project modifications. However, the DEA and the Addendum recognize that a landowner could decide to forego Federal funding and cancel the contract with NRCS to avoid making modifications identified through the section 7 consultation process. If Ulupalakua Ranch were to be one of the anticipated consultations over the next ten years, and if the section 7 consultation process resulted in project modifications that would limit the development of diversified agricultural operations, then Ulupalakua Ranch could avoid these project modifications by foregoing Federal funding, thus removing the Federal involvement. The cost of project modifications in that case would be the total amount of Federal funding foregone. If no Federal involvement exists, there can be no direct section 7 costs associated with critical habitat designation on Ulupalakua Ranch lands.

The remaining three concerns raised above by Ulupalakua Ranch, specifically that critical habitat designation will cause loss in revenue, create economic

hardship resulting from increased expenses to counter trespassing caused by increased curiosity over critical habitat lands, and lower economic returns and job loss caused by critical habitat dividing up sections of the ranch, are concerns about indirect impacts of critical habitat designation.

There is considerable uncertainty about whether any or all of these indirect impacts may occur, as they depend upon actions and decisions by entities other than the Service under circumstances for which there is limited or no history that can be used to determine the probability of different outcomes. To the extent possible, the possible costs associated with these impacts are discussed in Chapter VI, Section 4 of the DEA and Section 5 of the Addendum. However, based on the limited information available, it is not possible to determine the probability that any of these impacts will actually occur as a result of critical habitat designation.

(63) *Comment:* The Department of Hawaiian Homelands (DHHL) opposes the designation of critical habitat on their land in Unit E and H because the currently degraded land is slated for development of homes for native Hawaiian beneficiaries. DHHL further noted that critical habitat designation will cause significant economic harm, because: (1) The designation of critical habitat would require hundreds of future beneficiaries to conduct an environmental assessment and section 7 consultation in order to construct homes and prepare ground for farming; (2) the identified areas have already been subdivided into individual lots and DHHL does not have the authority to retroactively impose management plans on individual lessees, meaning that any regulatory impact will fall on individual lessees; (3) DHHL's homesteading program uses Federal programs to guarantee and insure the mortgages of homesteaders; (4) Federal funds may be used construct site improvements and homes; and (5) to the extent that the use of these programs triggers consultation under section 7, lessees will be subject to additional filing requirements, delays in homebuilding, possible additional expenditures, and limitations on property use. DHHL supports the proposed designations in areas that are not subject to homestead development, such as the cliff face found in unit G4.

*Our Response:* As discussed earlier, the Service reduced Units E and H to exclude certain areas for biological reasons, including DHHL land subject to homestead development. As such, possible impacts discussed in the comment are not expected.

(64) *Comment:* The Service did not adequately address the takings of private property as a result of designating critical habitat for endangered plants on Maui. If the critical habitat proposal would require reducing water diversions from any stream, the Service should investigate whether that would take anyone's vested water rights. In addition, if the proposed designation of critical habitat precipitates conversion of agricultural lands to conservation land that has no economically beneficial use, then the Federal and State governments will have taken private property. In addition, the government may also take property by excessive regulation as was evidenced in *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992).

*Our Response:* As noted above, none of the plants are stream-dependent for their survival and therefore would not cause a reduction in water diversion. Also, Chapter VI, Section 4.e. of the DEA, the Addendum and our response to comment 43 address costs involved in redistricting lands proposed for critical habitat designation from the Agricultural to the Conservation District. Any redistricting of land to Conservation and any corresponding loss of economically beneficial use would be decided by the State Land Use Commission, not the Service, based on an array of state laws and other factors, including the extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii state plan; the extent to which the proposed reclassification conforms to the applicable district standards; and the impacts of the proposed reclassification on the following: preservation or maintenance of important natural systems or habitats; maintenance of valued cultural, historical, or natural resources; maintenance of other natural resources relevant to Hawaii's economy; commitment of state funds and resources; provision for employment opportunities and economic development; and provision for housing opportunities for all income groups; and the representations and commitments made by the petitioner in securing a boundary change.

(65) *Comment:* A Federal nexus exists for the non-point source water discharge program. If water discharge into critical habitat does not meet water quality standards, a permit could be denied. The effect on agriculture may be devastating since some run-off from agricultural activities is avoidable.

*Our Response:* The State Department of Health Polluted Runoff Control Program and the State Office of

Planning, Coastal Zone Management Program, work together to address nonpoint source pollution through outreach and education and programs that utilize incentives. Under the Coastal Zone Act Reauthorization Amendments, Section 6217, the State is required to meet various conditions for approval of the State's Coastal Nonpoint Pollution Control Program by the U.S. Environmental Protection Agency. To meet these conditions, the State Department of Health is developing administrative rules to create Statewide enforceable policies and mechanisms to address nonpoint source pollution. These draft rules are currently the subject of public informational meetings. Public comments and suggestions received during these meetings will be considered before final rules are drafted and proposed to the Governor.

At the present time, there is no permit requirement for nonpoint source pollution. Moreover, the proposed rules regarding nonpoint source pollution make no reference to either water quality standards or to critical habitat. Until the State administrative rules are finalized, the economic impact caused by the interplay of nonpoint source pollution requirements and the designation of critical habitat is entirely speculative.

(66) *Comment:* The designation of critical habitat will impose costly procedural burdens on the Navy's ongoing efforts to clear ordnance at Kahoolawe. A careful analysis of the benefits and burdens of critical habitat designation may result in a determination that critical habitat designation on Kahoolawe is not prudent, especially in light of potential prescribed burns for clearing ordnance.

*Our Response:* Chapter VI, Section 3.e. of the DEA notes that November 2003 marks the end of the Navy's congressionally-mandated cleanup period. After that point, Kahoolawe Island Reserve Commission (KIRC) is likely to seek some form of Federal assistance. In the event that KIRC receives Federal funding in the future, the DEA estimates section 7 consultation costs at \$10,400 to \$78,500 including minor project modification costs (based on two to five consultations). However, as noted above, the Service reduced the designation on Kahoolawe for biological reasons, and the number of section 7 consultations over the next 10 years is expected to decrease to zero to three consultations as a result. As such, the Addendum revises future section 7 consultation costs to range from \$0 to \$47,100.

(67) *Comment:* Many commenters questioned the utility of critical habitat designation because it will not result in on-the-ground improvement of habitat or endangered species. Conversely, some commenters pointed out that critical habitat will prevent the Federal government from carrying out activities that destroy habitat or species in need of recovery and that it will benefit the people of Maui by preserving native forests, thus preventing erosion that pollutes water and smothers reefs.

*Our Response:* There is little disagreement in the published economic literature that real social welfare benefits can result from the conservation and recovery of endangered and threatened species (Bishop 1978, 1980; Brookshire and Eubanks 1983; Boyle and Bishop 1986; Hageman 1985, Samples *et al.* 1986; Stoll and Johnson 1984). Such benefits have also been ascribed to preservation of open space and biodiversity (see examples in Pearce and Moran (1994) and Fausold and Lilieholm (1999)), both of which are associated with species conservation. Likewise, a regional economy can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.

It is not feasible, however, to fully describe and accurately quantify these benefits in the specific context of the proposed critical habitat for the plants, because no quantified data on the value of the Maui and Kahoolawe species exists, and the Service is unable to provide specific data on the change in the quality of the ecosystem and the species as a result of the designation (for example, how many fewer ungulates will roam into the critical habitat, how many fewer invasive plants will be introduced as a result, and therefore how many more of the plants will be present in the area). The discussion presented in the DEA and in the Addendum provides examples of potential benefits, which derive primarily from the listing of the species, based on information obtained in the course of developing the economic analysis. It is not intended to provide a complete analysis of the benefits that could result from section 7 of the Act in general, or of critical habitat designation in particular. In short, the Service believes that the benefits of critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.

(68) *Comment:* The State Department of Land and Natural Resources, Land Division, requests that 15 tax map

parcels be excluded from critical habitat because they: (1) Are currently being leased for activities that could be adversely affected by the designation (e.g., agricultural leases); (2) have been identified as parcels with possible lease or development potential; (3) could suffer a significant loss in value; or (4) include water sources of water systems.

*Our Response:* As noted earlier, the Service modified the critical habitat designation for biological reasons, and as a result of the changes, five of the 15 parcels were no longer within the designation. The ten parcels remaining in the designation are located in Units A, G1, G3, H, I1, I2, I3, I4, K, and L. These ten parcels overlap with the designation in the amount of approximately 7,015 ac (2,839 ha). Approximately 90 percent (6,305 ac (2,552 ha)) is within the Conservation District. The other 10 percent (710 ac (287 ha)) is within the Agricultural District.

Chapter VI, Section 3.g. of the DEA and Section 4.e. of the Addendum discuss activities on Agricultural land and specifically recognize that some of the State managed Agricultural land is leased out to private entities as pastureage. DLNR-Land Division specifically identified three parcels within the proposed critical habitat designation that are leased for pasture purpose. Two of these parcels are no longer within the designation. The third parcel, approximately 710 ac (287 ha) in the Agricultural District, remains within the designation. No direct section 7 costs involving these leases are anticipated because there is no known Federal involvement.

Indirect costs, specifically the possibility of restrictions on the State's ability to lease the land caused by the interplay between critical habitat designation and State law, are discussed in Section 5.b. of the Addendum. As noted in Section 5.b., the likelihood of a future lawsuit interfering with existing agricultural activity within the designated critical habitat is considered low, based upon review of the existing Federal and State law provisions and professional judgment. However, for illustration purposes, an estimate of the potential impact is \$7,100 per year utilizing the land rents of \$10 per acre per year (as used in the DEA) since DLNR did not provide any additional information regarding the value of the affected leases.

Of the remaining ten parcels, DLNR did not identify which have possible lease or development potential, could suffer a significant loss in value, or include water sources for water systems. As noted above, the portions of these

parcels that overlap with the designation are all located within the Conservation District, where development is severely limited. Without more information from DLNR, it is difficult to evaluate how these parcels could suffer a significant loss in value as these parcels are already subject to the restrictions of the Conservation District. Finally, no costs are expected to occur from impacts to water systems, because none of the plants are stream-dependent for their survival and therefore would not cause a reduction in water diversion. In addition, water infrastructure is considered a manmade feature and therefore its operation and maintenance are not subject to critical habitat provisions of section 7, because these features and structures normally do not contain, and are not likely to develop, any primary constituent elements.

#### Summary of Changes From the Revised Proposed Rule

Based on a review of public comments received on the proposed determinations of critical habitat, we have reevaluated our proposed designations and included several changes to the final designations of critical habitat. These changes include the following:

(1) We published 139 critical habitat units for 60 plant species on the islands of Maui and Kahoolawe.

(2) The scientific names were changed for the following non-listed associated plant species found in the “Supplementary Information: Discussion of the Plant Taxa” section: *Thelypteris cyatheoides* changed to *Christella cyatheoides* (Palmer in press) in the discussions of *Cyanea glabra*, *Phlegmariurus mannii*, and *Pteris lydgatei*; *Lipochaeta lavarum* changed to *Melanthera lavarum* (Wagner and Robinson 2001) in the discussion of *Kanaloa kahoolawensis*, *Hedyotis coriacea*, *Hibiscus brackenridgei*, and *Spermolepis hawaiiensis*; *Styphelia tameiameia* changed to *Leptecophylla tameiameia* (Weiller 1999) in the discussion of *Asplenium fragile* var. *insulare*, *Bidens micrantha* ssp. *kalealaha*, *Diellia erecta*, *Lysimachia lydgatei*, *Melicope adscendens*, *Neraudia sericea*, *Phlegmariurus mannii*, *Plantago princeps*, *Platanthera holochila*, *Remyi mauiensis*, *Sanicula purpurea*, and *Schiedea haleakalensis*; *Lipochaeta integrifolia* changed to *Melanthera integrifolia* (Wagner and Robinson 2001) in the discussion of *Centaurium sebaeoides* and *Sesbania tomentosa*; *Pluchea symphytifolia* changed to *Pluchea carolinensis* (Wagner and Herbst 1995) in the

discussions of *Cyrtandra munroi*; *Lycopodium cernuum* changed to *Lycopodiella cernua* (Palmer 2003) in the discussions of *Platanthera holochila*; *Morelotia gahniiiformis* changed to *Gahnia gahniiiformis* in the discussions of *Platanthera holochila*; and *Sphenomeris chusana* changed to *Sphenomeris chinensis* in the discussion of *Pteris lydgatei*.

(3) We replaced the specific name of the associated native plant species, *Hibiscus arnottianus* (which is not reported to occur on Maui), with “*Hibiscus* spp.” in the discussion of *Gouania vitifolia* in the “Supplementary Information: Discussion of the Plant Taxa” and section 17.96.

(4) We removed the following species from the “Supplementary Information: Discussion of the Plant Taxa,” as they are not reported to occur on Maui: *Chloris barbata* was removed from the list of associated native plant species for *Kanaloa kahoolawensis*; *Andropogon virginicus* was removed from the list of associated native plant species for *Melicope balloui*; and *Pennisetum setaceum* was removed from the list of associated native plant species for *Colubrina oppositifolia*.

(5) For clarity regarding the number of location occurrences for each species (which do not necessarily represent viable populations) and the number of populations essential for the conservation of a species (e.g., 8 to 10 populations with 100, 300, or 500 reproducing individuals), we changed the word “population” to “occurrence” and updated the number of occurrences in the “Supplementary Information: Discussion of the Plant Taxa” section and in “Table 2.—Summary of existing occurrences and land ownership for 70 species reported from Maui and Kahoolawe” for the species listed below. In this final critical habitat rule, we have used “occurrence” when reporting collections or observations of one or more plants in a specific location. We have used “population” when discussing conservation goals for the Maui and Kahoolawe plants. We made the following changes for these species: *Alectryon macrococcus* changed from seven populations to 13 occurrences; *Argyroxiphium sandwicense* ssp. *macrocephalum* changed from four populations to seven occurrences; *Asplenium fragile* var. *insulare* changed from one population to two occurrences; *Bidens micrantha* ssp. *kalealaha* changed from three populations to four occurrences; *Bonamia menziesii* changed from four populations to six occurrences; *Cenchrus agrimonioides* changed from two populations to one occurrence;

*Clermontia samuelii* changed from four populations to seven occurrences; *Colubrina oppositifolia* changed from two populations to one occurrence; *Ctenitis squamigera* changed from six populations to 12 occurrences; *Cyanea copelandii* ssp. *haleakalaensis* changed from three populations to five occurrences; *Cyanea hamatiflora* ssp. *hamatiflora* changed from seven populations to nine occurrences; *Cyanea lobata* changed from four populations to five occurrences; *Cyanea mceldowneyi* changed from six populations to 11 occurrences; *Cyrtandra munroi* changed from four populations to five occurrences; *Dubautia plantaginea* ssp. *humilis* changed from one population to two occurrences; *Flueggea neowawraea* changed from three populations to four occurrences; *Geranium arboreum* changed from seven populations to 12 occurrences; *Geranium multiflorum* changed from eight populations to 13 occurrences; *Hesperomannia arborescens* changed from two populations to four occurrences; *Hesperomannia arbuscula* changed from two populations to eight occurrences; *Mariscus pennatifolius* changed from one population to two occurrences; *Melicope adscendens* changed from two populations to 16 occurrences; *Melicope balloui* changed from two populations to three occurrences; *Melicope knudsenii* changed from one population to four occurrences; *Melicope ovalis* changed from one population to two occurrences; *Neraudia sericea* changed from three populations to five occurrences; *Plantago princeps* changed from five populations to eight occurrences; *Platanthera holochila* changed from three populations to five occurrences; *Remyi mauiensis* changed from three populations to five occurrences; *Sanicula purpurea* changed from five populations to seven occurrences; *Sesbania tomentosa* changed from eight populations to six occurrences; *Spermolepis hawaiiensis* changed from four populations to five occurrences; *Tetramolopium capillare* changed from four populations to five occurrences; *Tetramolopium remyi* changed from zero populations to one occurrence; *Vigna o-wahuensis* changed from four populations to two occurrences; and *Zanthoxylum hawaiiense* changed from four populations to nine occurrences.

(6) We changed “flowering cycles, pollination vectors, seed dispersal agents” to “reproduction cycles, dispersal agents” in the life history portion of the “Supplementary Information: Discussion of the Plant

*Taxa*” section for the fern or fern ally species, *Asplenium fragile* var. *insulare*, *Ctenitis squamigera*, *Diellia erecta*, *Diplazium molokaiense*, *Phlegmariurus mannii*, and *Pteris lydgatei*.

(7) We revised the list of excluded, manmade features in the “Criteria Used to Identify Critical Habitat” and section 17.96 to include additional features based on information received during the public comment periods.

(8) We refined the elevation ranges for *Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonioides*, *Centaurium sebaeoides*, *Clermontia lindseyana*, *Clermontia oblongifolia* ssp. *mauiensis*, *Clermontia samuelii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea glabra*, *Cyanea lobata*, *Cyanea mceldowneyi*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Dubautia plantaginea* ssp. *humilis*, *Flueggea neowawraea*, *Geranium arboreum*, *Geranium multiflorum*, *Gouania vitifolia*, *Hedyotis coriacea*, *Hesperomannia arbuscula*, *Hibiscus brackenridgei*, *Ischaemum byrone*,

*Isodendron pyrifolium*, *Kanaloa kahoolawensis*, *Mariscus pennatifolius*, *Melicope adscendens*, *Melicope balloui*, *Melicope knudsenii*, *Melicope mucronulata*, *Peucedanum sandwicense*, *Phlegmariurus mannii*, *Phyllostegia mannii*, *Phyllostegia mollis*, *Plantago princeps*, *Platanthera holochila*, *Pteris lydgatei*, *Remya mauiensis*, *Sanicula purpurea*, *Sesbania tomentosa*, *Tetramolopium capillare*, *Tetramolopium remyi*, and *Vigna owahuensis*.

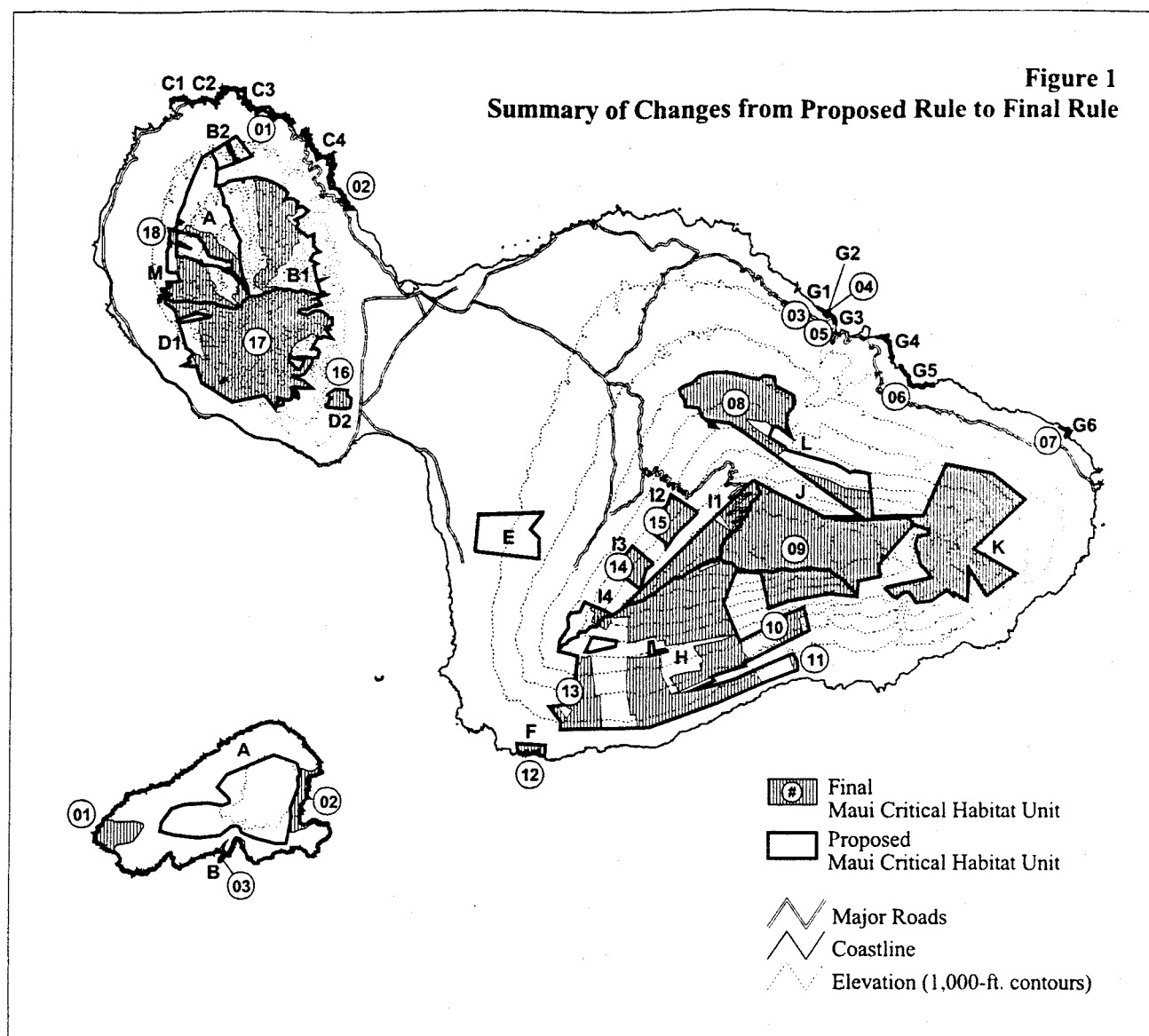
(9) We corrected the typographic error in the acreage published for the revised proposed rule of critical habitat on Kahoolawe from 713 ha (1,762 ac) to 7,683 ha (18,984 ac).

(10) We made revisions to the unit boundaries based on information supplied by commenters, as well as information gained from field visits to some of the sites, that indicated that the primary constituent elements were not present in certain portions of the proposed unit, that certain changes in land use had occurred on lands within the proposed critical habitat that would preclude those areas from supporting the primary constituent elements, or

that the areas were not essential to the conservation of the species in question. In addition, areas were excluded based on weighing the benefits of inclusion versus exclusion pursuant to section 4(b)(2) of the Act (see “Economic Analysis”).

(11) In the draft rule, we proposed that TNCH’s Kapunakea and Waikamoi Preserves and the State’s upper Hanawi NAR not be included as critical habitat pursuant to section 3(5)(A) of the Act, because they are not in need of special management or protection. The reasons for this were discussed in detail in the proposed rule. In this final rule we have determined that they should also be excluded under section 4(b)(2) of the Act, because we have determined that the benefits of exclusion exceed the benefits of inclusion due to the positive and voluntary conservation efforts underway there (see discussion under Analysis of Impacts Under Section 4(b)(2)).

A brief summary of the modifications made to each unit is given below (see also Figure 1).



### Maui A

This unit was proposed as critical habitat for 16 species: *Alectryon macrococcus*; *Clermontia oblongifolia* ssp. *mauiensis*; *Colubrina oppositifolia*; *Ctenitis squamigera*; *Cyanea glabra*; *Cyanea lobata*; *Cyrtandra munroi*; *Gouania vitifolia*; *Hedyotis mannii*; *Hesperomannia arbuscula*; *Phlegmariurus mannii*; *Platanthera holochila*; *Plantago princeps*; *Pteris lygatei*; *Remya mauiensis*; and *Sanicula purpurea*. We excluded the proposed critical habitat on ML&P lands because the benefits of excluding them outweighed the benefits of inclusion (see "Analysis of Impacts Under Section 4(b)(2): Other Impacts"). Proposed critical habitat in Maui A for *Colubrina oppositifolia*, *Plantago princeps*, and *Pteris lygatei*, all multi-island species,

was excluded. This area is not essential to the conservation of these three species because it has a lower proportion of associated native species and more nonnative species than other areas we consider to be essential to the conservation of these three species. In addition, there are at least eight other locations for each of these species within their historical ranges on Maui and other islands which provide habitat essential for their conservation and which are either designated as critical habitat in this final rule or have been designated or proposed for designation in other rules.

The area designated as critical habitat for the Maui endemic species, *Remya mauiensis*, provides habitat within its historical range for two populations. The area designated as critical habitat for the following multi-island species

provides habitat for two populations of *Alectryon macrococcus*; three populations each of *Clermontia oblongifolia* ssp. *mauiensis*, *Ctenitis squamigera*, and *Cyanea glabra*; two populations of *Cyanea lobata*; four populations of *Cyrtandra munroi*; one population of *Gouania vitifolia*; two populations each of *Hedyotis mannii* and *Hesperomannia arbuscula*; one population each of *Phlegmariurus mannii* and *Platanthera holochila*; and three populations of *Sanicula purpurea* within their historical ranges.

These modifications resulted in the reduction from 3,884 ha (9,598 ac) to 1,632 ha (4,033 ac). This unit was renamed Maui 17—*Alectryon macrococcus*—d, 17—*Alectryon macrococcus*—e, 17—*Clermontia oblongifolia* ssp. *mauiensis*—a, 17—*Clermontia oblongifolia* ssp.

*mauiensis*—c, 17—*Ctenitis squamigera*—b, 17—*Ctenitis squamigera*—c, 17—*Cyanea glabra*—e, 17—*Cyanea glabra*—f, 17—*Cyanea lobata*—a, 17—*Cyrtandra munroi*—a, 17—*Cyrtandra munroi*—b, 17—*Gouania vitifolia*—a, 17—*Hedyotis mannii*—a, 17—*Hesperomannia arbuscula*—a, 17—*Phlegmariurus mannii*—d, 17—*Platanthera holochila*—c, 17—*Remya mauiensis*—b, 17—*Remya mauiensis*—c, 17—*Sanicula purpurea*—b, 18—*Alectryon macrococcus*—f, 18—*Ctenitis squamigera*—d, and 18—*Remya mauiensis*—d.

#### Maui B

This unit was proposed as critical habitat for 11 species: *Clermontia oblongifolia* ssp. *mauiensis*; *Ctenitis squamigera*; *Cyanea lobata*; *Cyrtandra munroi*; *Diplazium molokaiense*; *Hesperomannia arborescens*; *Phlegmariurus mannii*; *Platanthera holochila*; *Plantago princeps*; *Pteris lygatei*; and *Sanicula purpurea*. We excluded the proposed critical habitat on ML&P lands because the benefits of excluding them outweighed the benefits of inclusion (see “Analysis of Impacts Under Section 4(b)(2): Other Impacts”). As a result, no critical habitat was designated for *Hesperomannia arborescens*, a multi-island species, on Maui because all of the habitat proposed for this species is within these lands. However, we have proposed (67 FR 37108) and designated (68 FR 12981) critical habitat on other islands within its historical range. We excluded the proposed critical habitat for the multi-island species *Ctenitis squamigera* and *Platanthera holochila* in Maui B. Areas proposed for these two species were excluded because they are not essential to the conservation of these two species. We are designating adequate and more appropriate habitat elsewhere on Maui for these two species in this final rule and have designated or proposed for designation habitat on other islands within their historical ranges. There is a lower likelihood that the biological features essential to these species will persist there because these areas have a low likelihood of being managed by the landowner for conservation. In addition, there are at least eight other locations for each of these species within their historical ranges on Maui and other islands.

The area designated as critical habitat for the multi-island species provides habitat within historical range for six populations of *Clermontia oblongifolia* ssp. *mauiensis*; three populations each of *Cyanea lobata*, *Cyrtandra munroi*, and *Diplazium molokaiense*; one population each of *Phlegmariurus*

*mannii* and *Plantago princeps*; two populations of *Pteris lygatei*; and four populations of *Sanicula purpurea*.

These modifications resulted in the reduction from 4,736 ha (11,701 ac) to 1,760 ha (4,349 ac). This unit was renamed 17—*Clermontia oblongifolia* ssp. *mauiensis*—b, 17—*Clermontia oblongifolia* ssp. *mauiensis*—c, 17—*Cyanea lobata*—c, 17—*Cyrtandra munroi*—c, 17—*Diplazium molokaiense*—c, 17—*Phlegmariurus mannii*—d, 17—*Plantago princeps*—b, 17—*Pteris lygatei*—a, 17—*Sanicula purpurea*—a, 17—*Sanicula purpurea*—b, and 17—*Sanicula purpurea*—c.

#### Maui C

This unit was proposed as critical habitat for three species: *Brighamia rockii*; *Centaurium sebaeoides*; and *Sesbania tomentosa*. Modifications were made to this unit to exclude areas that do not contain the primary constituent elements for these species.

The area designated as critical habitat for these multi-island species provides habitat within their historical ranges for two populations of *Brighamia rockii* and one population each of *Centaurium sebaeoides* and *Sesbania tomentosa*.

These modifications resulted in the reduction from 356 ha (880 ac) to 110 ha (270 ac). This unit was renamed 2—*Brighamia rockii*—a, 2—*Brighamia rockii*—b, 2—*Centaurium sebaeoides*—b, and 1—*Sesbania tomentosa*—a.

#### Maui D

This unit was proposed as critical habitat for 28 species: *Cenchrus agrimonoides*; *Clermontia oblongifolia* ssp. *mauiensis*; *Ctenitis squamigera*; *Cyanea glabra*; *Cyanea grimesiana* ssp. *grimesiana*; *Cyanea lobata*; *Cyrtandra munroi*; *Diellia erecta*; *Diplazium molokaiense*; *Dubautia plantaginea* ssp. *humilis*; *Gouania vitifolia*; *Hedyotis coriacea*; *Hedyotis mannii*; *Hesperomannia arbuscula*; *Hibiscus brackenridgei*; *Isodendron pyrifolium*; *Lysimachia lydgatei*; *Neraudia sericea*; *Peucedanum sandwicense*; *Phlegmariurus mannii*; *Plantago princeps*; *Platanthera holochila*; *Pteris lygatei*; *Remya mauiensis*; *Sanicula purpurea*; *Spermolepis hawaiiensis*; *Tetramolopium capillare*; and *Tetramolopium remyi*. We excluded the proposed critical habitat in Maui D for *Clermontia oblongifolia* ssp. *mauiensis*, *Cyrtandra munroi*, *Isodendron pyrifolium*, *Neraudia sericea*, *Tetramolopium capillare*, and *Tetramolopium remyi*. Areas proposed for these six species were excluded because they are not essential to the conservation of these species. There is a lower likelihood that the biological

features essential to these species will persist there because they have a lower proportion of associated native species than other areas we consider to be essential to the conservation of these six species and they have a low likelihood of being managed for conservation. In addition, there are at least eight other locations for each of these species designated elsewhere on Maui and proposed or designated on other islands within their historical ranges.

The area designated as critical habitat for the Maui endemic species provides habitat for six populations of *Dubautia plantaginea* ssp. *humilis* and four populations of *Remya mauiensis* within their historical ranges. The area designated as critical habitat for the multi-island species provides habitat for one population of *Cenchrus agrimonoides*; two populations of *Ctenitis squamigera*; four populations of *Cyanea glabra*; two populations each of *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea lobata*, and *Diellia erecta*; three populations of *Diplazium molokaiense*; one population of *Gouania vitifolia*; two populations each of *Hedyotis coriacea* and *Hedyotis mannii*; five populations of *Hesperomannia arbuscula*; three populations of *Hibiscus brackenridgei*; eight populations of *Lysimachia lydgatei*; one population each of *Peucedanum sandwicense*, *Phlegmariurus mannii*, *Plantago princeps*, *Platanthera holochila*, and *Pteris lygatei*; three populations of *Sanicula purpurea*; and one population of *Spermolepis hawaiiensis* within their historical ranges.

These modifications resulted in the reduction from 7,162 ha (17,698 ac) to 6,358 ha (15,709 ac). This unit was renamed 17—*Cenchrus agrimonoides*—b, 17—*Ctenitis squamigera*—a, 17—*Cyanea glabra*—d, 17—*Cyanea glabra*—e, 17—*Cyanea glabra*—g, 17—*Cyanea grimesiana* ssp. *grimesiana*—a, 17—*Cyanea lobata*—b, 17—*Diellia erecta*—c, 17—*Diellia erecta*—d, 17—*Diellia erecta*—e, 17—*Diellia erecta*—f, 17—*Diplazium molokaiense*—c, 17—*Dubautia plantaginea* ssp. *humilis*—a, 17—*Dubautia plantaginea* ssp. *humilis*—b, 17—*Dubautia plantaginea* ssp. *humilis*—c, 17—*Gouania vitifolia*—a, 17—*Hedyotis coriacea*—a, 17—*Hedyotis coriacea*—b, 17—*Hedyotis mannii*—a, 17—*Hesperomannia arbuscula*—a, 17—*Hesperomannia arbuscula*—b, 17—*Hibiscus brackenridgei*—b, 17—*Lysimachia lydgatei*—a, 17—*Lysimachia lydgatei*—b, 17—*Lysimachia lydgatei*—c, 17—*Lysimachia lydgatei*—d, 17—*Lysimachia lydgatei*—e, 17—*Peucedanum sandwicense*—b, 17—*Phlegmariurus mannii*—e, 17—*Plantago*



*princeps*—b, 17—*Platanthera holochila*—b, 17—*Pteris lidgatei*—b, 17—*Remya mauiensis*—a, 17—*Remya mauiensis*—b, 17—*Sanicula purpurea*—b, 17—*Spermolepis hawaiiensis*—b, and 16—*Hibiscus brackenridgei*—a.

#### Maui E

This unit was proposed as critical habitat for two multi-island species, *Bonamia menziesii* and *Hibiscus brackenridgei*. The entire unit is eliminated from the final rule. There is a lower likelihood that the biological features essential to these species will persist there because the area has a low likelihood of being managed for conservation and there are 10 other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands. There is also habitat designated elsewhere on Maui for *Bonamia menziesii* and *Hibiscus brackenridgei*. Exclusion of this unit from critical habitat for *Bonamia menziesii* and *Hibiscus brackenridgei* resulted in the overall reduction of 14,101 ha (34,843 ac) of critical habitat on Maui.

#### Maui F

No changes were made to Maui F. The area designated as critical habitat for the multi-island species *Vigna o-wahuensis* provides habitat within its historical range for one population. This unit remains 144 ha (357 ac) but was renamed 12—*Vigna o-wahuensis*—a.

#### Maui G

This unit was proposed as critical habitat for four species: *Brighamia rockii*; *Ischaemum byrone*; *Mariscus pennatiformis*; and *Peucedanum sandwicense*. Modifications were made to this unit to exclude areas that do not contain the primary constituent elements for these species. The portion excluded was not essential to the conservation of these four species because it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these four species, it has a low likelihood of being managed for conservation (Buck, *in litt.* 2002), and there are at least eight other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands.

The area designated as critical habitat for these multi-island species provides habitat for one population of *Brighamia rockii*, two populations each of *Ischaemum byrone* and *Mariscus pennatiformis*, and one population of

*Peucedanum sandwicense* within their historical ranges.

These modifications resulted in the reduction from 83 ha (185 ac) to 52 ha (128 ac). This unit was renamed 3—*Brighamia rockii*—c, 4—*Brighamia rockii*—d, 5—*Brighamia rockii*—e, 5—*Ischaemum byrone*—a, 7—*Ischaemum byrone*—b, 5—*Mariscus pennatiformis*—a, and 4—*Peucedanum sandwicense*—a.

#### Maui H

This unit was proposed as critical habitat for 25 species: *Alectryon macrococcus*; *Argyroxiphium sandwicense* ssp. *macrocephalum*; *Bidens micrantha* ssp. *kalealaha*; *Bonamia menziesii*; *Cenchrus agrimonoides*; *Clermontia lindseyana*; *Colubrina oppositifolia*; *Diellia erecta*; *Diplazium molokaiense*; *Flueggea neowawraea*; *Geranium arboreum*; *Geranium multiflorum*; *Lipochaeta kamolensis*; *Melicope adscendens*; *Melicope knudsenii*; *Melicope mucronulata*; *Neraudia sericea*; *Nototrichium humile*; *Phlegmariurus mannii*; *Phyllostegia mollis*; *Plantago princeps*; *Sesbania tomentosa*; *Schiedea haleakalensis*; *Spermolepis hawaiiensis*; and *Zanthoxylum hawaiiense*. We excluded the proposed critical habitat on Ulupalakua and Haleakala Ranch lands because the benefits of excluding these lands outweighed the benefits of including them in critical habitat (see “Analysis of Impacts Under Section 4(b)(2)”). We excluded the proposed critical habitat for the Maui endemics *Geranium arboreum* and *Schiedea haleakalensis*, and the multi-island species *Zanthoxylum hawaiiense*. Areas proposed for these three species were excluded because we have proposed adequate and more appropriate habitat elsewhere on Maui and, for *Z. hawaiiense*, on other islands within its historical ranges. The portion excluded was not essential to the conservation of these three species because it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these three species, it has a low likelihood of being managed for conservation (Urdman *in litt.*, 2002; Silva *in litt.*, 2002), and there are at least eight other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands. There is habitat designated elsewhere on Maui for *Geranium arboreum*, *Schiedea haleakalensis*, and *Zanthoxylum hawaiiense*.

The area designated as critical habitat for the Maui endemic species provides habitat for one population each of

*Argyroxiphium sandwicense* ssp. *macrocephalum* and *Geranium multiflorum*, four populations of *Lipochaeta kamolensis*, and one population of *Melicope adscendens* within their historical ranges. The area designated as critical habitat for the multi-island species provides habitat for two populations of *Alectryon macrococcus*; four populations of *Bidens micrantha* ssp. *kalealaha*; one population each of *Bonamia menziesii* and *Cenchrus agrimonoides*; two populations of *Clermontia lindseyana*; one population each of *Colubrina oppositifolia*, *Diellia erecta*, *Diplazium molokaiense*, and *Flueggea neowawraea*; two populations each of *Melicope knudsenii* and *Melicope mucronulata*; three populations of *Neraudia sericea*; two populations of *Nototrichium humile*; one population of *Phlegmariurus mannii*; two populations of *Phyllostegia mollis*; and one population each of *Plantago princeps*, *Sesbania tomentosa*, and *Spermolepis hawaiiensis* within their historical ranges.

These modifications resulted in the reduction from 14,101 ha (34,843 ac) to 9,823 ha (24,270 ac). This unit was renamed 9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a, 9—*Bidens micrantha* ssp. *kalealaha*—b, 9—*Clermontia lindseyana*—a, 9—*Clermontia lindseyana*—b, 9—*Diellia erecta*—b, 9—*Diplazium molokaiense*—b, 9—*Flueggea neowawraea*—a, 9—*Geranium multiflorum*—c, 9—*Lipochaeta kamolensis*—a, 9—*Melicope knudsenii*—a, 9—*Melicope mucronulata*—a, 9—*Neraudia sericea*—a, 9—*Nototrichium humile*—a, 9—*Phlegmariurus mannii*—b, 9—*Phyllostegia mollis*—b, 9—*Plantago princeps*—a, 10—*Alectryon macrococcus*—b, 11—*Lipochaeta kamolensis*—b, 13—*Alectryon macrococcus*—c, 13—*Bonamia menziesii*—a, 13—*Cenchrus agrimonoides*—a, 13—*Colubrina oppositifolia*—a, 13—*Flueggea neowawraea*—b, 13—*Melicope adscendens*—a, 13—*Melicope knudsenii*—b, 13—*Melicope mucronulata*—b, 13—*Sesbania tomentosa*—b, and 13—*Spermolepis hawaiiensis*—a.

#### Maui I

This unit was proposed as critical habitat for 11 species: *Argyroxiphium sandwicense* ssp. *macrocephalum*; *Asplenium fragile* var. *insulare*; *Bidens micrantha* ssp. *kalealaha*; *Clermontia lindseyana*; *Diellia erecta*; *Diplazium molokaiense*; *Geranium arboreum*; *Geranium multiflorum*; *Phlegmariurus mannii*; *Phyllostegia mollis*; and



*Plantago princeps*. We excluded the proposed critical habitat on Haleakala Ranch lands because the benefits of excluding these lands outweighed the benefits of including them in critical habitat (see 4(b)(2) exclusion section). We excluded the proposed critical habitat for the Maui endemic *Geranium arboreum* and the multi-island species *Diplazium molokaiense*, *Phlegmariurus mannii*, *Phyllostegia mollis*, and *Plantago princeps*. The portion excluded was not essential to the conservation of these five species because it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these five species. There is a lower likelihood that the biological features essential to these species will persist there because it has a low likelihood of being managed for conservation (Silva *in litt.*, 2002). There is habitat designated elsewhere on Maui for *Diplazium molokaiense*, *Geranium arboreum*, *Phlegmariurus mannii*, *Phyllostegia mollis*, and *Plantago princeps*.

The area designated as critical habitat for the Maui endemic species provides habitat for one population of *Argyroxiphium sandwicense* ssp. *macrocephalum*, three populations of *Geranium arboreum*, and six populations of *Geranium multiflorum* within their historical ranges. The area designated as critical habitat for the multi-island species provides habitat for two populations of *Asplenium fragile* var. *insulare*, four populations of *Bidens micrantha* ssp. *kalealaha*, and one population each of *Clermontia lindseyana* and *Diellia erecta* within their historical ranges.

These modifications resulted in the reduction from 3,491 ha (8,625 ac) to 2,961 ha (7,383 ac). This unit was renamed 9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a, 9—*Asplenium fragile* var. *insulare*—a, 9—*Bidens micrantha* ssp. *kalealaha*—b, 9—*Clermontia lindseyana*—b, 9—*Diellia erecta*—a, 9—*Geranium multiflorum*—b, 14—*Geranium arboreum*—b, and 15—*Geranium arboreum*—c.

#### Maui J

This unit was proposed as critical habitat for eight species: *Argyroxiphium sandwicense* ssp. *macrocephalum*; *Asplenium fragile* var. *insulare*; *Bidens micrantha* ssp. *kalealaha*; *Clermontia samuelii*; *Geranium multiflorum*; *Plantago princeps*; *Platanthera holochila*; and *Schiedea haleakalensis*. We excluded the proposed critical habitat for *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Geranium*

*multiflorum*, and *Platanthera holochila* in Maui J. This area is not essential to the conservation of these three species because it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of these three species. For the Maui endemic *Argyroxiphium sandwicense* ssp. *macrocephalum*, the recovery goal is one population with more than 50,000 individuals. We are designating habitat essential for the conservation of this species in Maui unit 9. There are at least eight other locations on Maui which provide habitat for the endemic species *Geranium multiflorum* that are being designated as critical habitat. There are at least eight other locations in its historical range on Maui and other islands that provide habitat for the multi-island species *Platanthera holochila* that are being designated as critical habitat, have been designated as critical habitat, or have been proposed for designation.

The area designated as critical habitat for the Maui endemic species *Schiedea haleakalensis* provides habitat within its historical range for four populations. The area designated as critical habitat for the multi-island species provides habitat for two populations of *Asplenium fragile* var. *insulare*, three populations of *Bidens micrantha* ssp. *kalealaha*, five populations of *Clermontia samuelii*, and one population of *Plantago princeps* within their historical ranges.

These modifications resulted in the reduction from 5,790 ha (14,308 ac) to 5,785 ha (14,295 ac). This unit was renamed 9—*Asplenium fragile* var. *insulare*—a, 9—*Bidens micrantha* ssp. *kalealaha*—a, 9—*Clermontia samuelii*—a, 9—*Plantago princeps*—a, 9—*Schiedea haleakalensis*—a, and 9—*Schiedea haleakalensis*—b.

#### Maui K

This unit was proposed as critical habitat for 11 species: *Alectryon macrococcus*; *Clermontia samuelii*; *Cyanea copelandii* ssp. *haleakalaensis*; *Cyanea glabra*; *Cyanea hamatiflora* ssp. *hamatiflora*; *Geranium multiflorum*; *Melicope balloui*; *Melicope ovalis*; *Phlegmariurus mannii*; *Plantago princeps*; and *Platanthera holochila*. We excluded the proposed critical habitat for *Alectryon macrococcus*, *Clermontia samuelii*, *Cyanea copelandii* ssp. *haleakalaensis*, *Cyanea hamatiflora* ssp. *hamatiflora*, and *Plantago princeps*. This area is not essential to the conservation of these five species because it has a lower proportion of associated native species than other areas we consider to be essential to the

conservation of these five species, and there are at least eight other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands.

The area designated as critical habitat for the Maui endemic species provides habitat for six populations of *Geranium multiflorum*, two populations of *Melicope balloui*, and three populations of *Melicope ovalis* within their historical ranges. The area designated as critical habitat for the multi-island species provides habitat for five populations of *Clermontia samuelii*, three populations each of *Cyanea glabra* and *Phlegmariurus mannii*, and one population of *Platanthera holochila* within their historical ranges.

These modifications resulted in the reduction from 5,464 ha (13,502 ac) to 5,458 ha (13,487 ac). This unit was renamed 9—*Clermontia samuelii*—a, 9—*Cyanea glabra*—b, 9—*Cyanea glabra*—c, 9—*Geranium multiflorum*—b, 9—*Melicope balloui*—b, 9—*Melicope ovalis*—a, 9—*Phlegmariurus mannii*—c, and 9—*Platanthera holochila*—a.

#### Maui L

This unit was proposed as critical habitat for 16 species: *Alectryon macrococcus*; *Argyroxiphium sandwicense* ssp. *macrocephalum*; *Asplenium fragile* var. *insulare*; *Clermontia samuelii*; *Cyanea copelandii* ssp. *haleakalaensis*; *Cyanea glabra*; *Cyanea hamatiflora* ssp. *hamatiflora*; *Cyanea mceldowneyi*; *Diplazium molokaiense*; *Geranium multiflorum*; *Melicope balloui*; *Phlegmariurus mannii*; *Phyllostegia mollis*; *Platanthera holochila*; and *Zanthoxylum hawaiiense*. We excluded the proposed critical habitat for the Maui endemic *Cyanea mceldowneyi*, and the multi-island species *Alectryon macrococcus* and *Asplenium fragile* var. *insulare*. The portion excluded has a lower likelihood that the biological features essential to these species will persist because it has a low likelihood of being managed for conservation. In addition, there are at least eight other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands.

The area designated as critical habitat for the Maui endemic species provides habitat for one population of *Argyroxiphium sandwicense* ssp. *macrocephalum*, three populations of *Cyanea copelandii* ssp. *haleakalaensis* and *Cyanea hamatiflora* ssp. *hamatiflora*, seven populations of *Geranium multiflorum*, and one

population of *Melicope balloui* within their historical ranges. The area designated as critical habitat for the multi-island species provides habitat for five populations of *Clermontia samuelii*; two populations each of *Cyanea glabra*, *Diplazium molokaiense*, *Phlegmariurus mannii*, and *Phyllostegia mannii*; and one population each of *Phyllostegia mollis*, *Platanthera holochila*, and *Zanthoxylum hawaiiense* within their historical ranges.

These modifications resulted in the reduction from 4,612 ha (11,396 ac) to 3,608 ha (8,916 ac). This unit was renamed 8—*Cyanea copelandii* ssp. *haleakalaensis*—a, 8—*Cyanea glabra*—a, 8—*Cyanea hamatiflora* ssp. *hamatiflora*—a, 8—*Diplazium molokaiense*—a, 8—*Geranium multiflorum*—a, 8—*Melicope balloui*—a, 8—*Phlegmariurus mannii*—a, 8—*Phyllostegia mannii*—a, 8—*Phyllostegia mollis*—a, 8—*Zanthoxylum hawaiiense*—a, 9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a, 9—*Clermontia samuelii*—a, 9—*Geranium multiflorum*—b, and 9—*Platanthera holochila*—a.

#### Maui M

This unit was proposed as critical habitat for *Spermolepis hawaiiense*. The entire area proposed for this species is eliminated from this final rule. There is a lower likelihood that the biological features essential to these species will persist there because it has a low likelihood of being managed for conservation (Buck, *in litt.* 2002) and it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of this species. In addition, there are 10 other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands. There is habitat designated elsewhere on Maui for *Spermolepis hawaiiense*.

#### Kahoolawe A

This unit was proposed as critical habitat for four species: *Hibiscus brackenridgei*; *Kanaloa kahoolawensis*; *Sesbania tomentosa*; and *Vigna o-wahuensis*. We excluded the proposed critical habitat for *Hibiscus brackenridgei*, *Sesbania tomentosa*, and *Vigna o-wahuensis*. There is a lower likelihood that the biological features essential to these species will persist there because it has a low likelihood of being managed for conservation (KIRC, *in litt.* 2002) and it has a lower proportion of associated native species than other areas we consider to be essential to the conservation of this

species. In addition, there are 10 other locations that have been designated or proposed to meet the recovery goal of 8 to 10 populations throughout their historical ranges on this and other islands. Modifications were also made to this unit to exclude areas that do not contain the primary constituent elements for *Kanaloa kahoolawensis*.

The area designated as critical habitat for the multi-island species *Kanaloa kahoolawensis* provides habitat within its historical range for seven populations.

These modifications resulted in the reduction from 7,683 ha (18,984 ac) to 1,175 ha (2,903 ac). This unit was renamed Kahoolawe 1—*Kanaloa kahoolawensis*—a and Kahoolawe 2—*Kanaloa kahoolawensis*—b.

#### Kahoolawe B

This unit was proposed as critical habitat for two species: *Kanaloa kahoolawensis* and *Sesbania tomentosa*. We excluded the proposed critical habitat for the multi-island species *Sesbania tomentosa*. There is a lower likelihood that the biological features essential to this species will persist there because it has a low likelihood of being managed for conservation (KIRC, *in litt.* 2002) and there are 10 other locations that have been designated to meet the recovery goal of 8 to 10 populations throughout its historical range on this and other islands.

The area designated as critical habitat for the multi-island species *Kanaloa kahoolawensis* provides habitat within its historical range for one population.

There was no change in the area proposed in the final designation. It remains at 5 ha (12 ac). This unit was renamed Kahoolawe 3—*Kanaloa kahoolawensis*—c.

#### Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) The specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. “Conservation,” as defined by the Act, means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. In our regulations at 50 CFR 402.02, we define destruction or adverse modification as “\* \* \* a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.” However, in the March 15, 2001, decision of the United States Court of Appeals for the Fifth Circuit (*Sierra Club v. U.S. Fish and Wildlife Service et al.*, 245 F.3d 434) regarding a not prudent finding, the Court found our definition of destruction or adverse modification as currently contained in 50 CFR 402.02 to be invalid. In response to this decision, we are reviewing the regulatory definition of adverse modification in relation to the conservation of the species.

In order to be included in a critical habitat designation, areas within the geographical range of the species at the time of listing must contain the physical or biological features essential to the conservation of the species or, for an area outside the geographical area occupied by the species at the time of listing, the area itself must be essential to the conservation of the species (16 U.S.C. 1532(5)(A)).

Section 4 of the Act requires that we designate critical habitat for a species, to the extent such habitat is determinable, at the time of listing. When we designate critical habitat at the time of listing or under short court-ordered deadlines, we may not have sufficient information to identify all the areas essential for the conservation of the species, we may inadvertently include areas that later will be shown to be nonessential. Nevertheless, we are required to designate those areas we know to be critical habitat, using the best information available to us.

Within the geographic areas occupied by the species, we will designate only areas that have features and habitat characteristics that are necessary to sustain the species. If the information available at the time of designation does not show that an area provides essential life cycle needs of the species, then the

area should not be included in the critical habitat designation.

Our regulations state that "The Secretary shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species" (50 CFR 424.12(e)). Accordingly, when the best available scientific and commercial data do not demonstrate that the conservation needs of the species require designation of critical habitat outside of occupied areas, we will not designate critical habitat in areas outside the geographic area occupied by the species.

Our Policy on Information Standards Under the Endangered Species Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that our decisions represent the best scientific and commercial data available. It requires our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information should be the listing package for the species. Additional information may be obtained from recovery plans, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, and biological assessments or other unpublished materials.

It is important to clearly understand that critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery. Areas outside the critical habitat designation will continue to be subject to conservation actions that may be implemented under section 7(a)(1) and to the regulatory protections afforded by the Act's 7(a)(2) jeopardy standard and section 9 prohibitions, as determined on the basis of the best available information at the time of the action. We specifically anticipate that federally funded or assisted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information

available to these planning efforts calls for a different outcome. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species.

#### Prudence

Designation of critical habitat is not prudent when one or both of the following situations exist: (i) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of such threat to the species; or (ii) such designation of critical habitat would not be beneficial to the species (50 CFR 424.12(a)(1)).

To determine whether critical habitat would be prudent for each species, we analyzed the potential threats and benefits for each species in accordance with the court's order. In the final critical habitat rule published for Kauai and Niihau plants, we determined that designation of critical habitat was not prudent for *Acaena exigua*, a species reported from Maui as well as from Kauai because it had not been seen recently in the wild, and no genetic material of this species was known to exist (68 FR 9115). In other final rules, we have found that critical habitat would be prudent for the following 45 species that are reported from Maui and Kahoolawe as well as from Lanai, Kauai, Niihau, and Molokai: *Adenophorus periens*; *Alectryon macrococcus*; *Bidens micrantha* ssp. *kalealaha*; *Bonamia menziesii*; *Brighamia rockii*; *Cenchrus agrimonoides*; *Centaurium sebaeoides*; *Clermontia oblongifolia* ssp. *mauiensis*; *Clermontia samuelii*; *Ctenitis squamigera*; *Cyanea copelandii* ssp. *haleakalaensis*; *Cyanea glabra*; *Cyanea grimesiana* ssp. *grimesiana*; *Cyanea hamatiflora* ssp. *hamatiflora*; *Cyanea lobata*; *Cyrtandra munroi*; *Delissea undulata*; *Diellia erecta*; *Diplazium molokaiense*; *Flueggea neowawraea*; *Hedyotis mannii*; *Hesperomannia arborescens*; *Hibiscus brackenridgei*; *Ischaemum byrone*; *Isodendron pyrifolium*; *Kanaloa kahoolawensis*; *Mariscus pennatifolius*; *Melicope knudsenii*; *Melicope mucronulata*; *Neraudia sericea*; *Peucedanum sandwicense*; *Phlegmariurus mannii*; *Phyllostegia mannii*; *Phyllostegia mollis*; *Phyllostegia parviflora*; *Plantago princeps*; *Platanthera holochila*; *Pteris lidgatei*; *Schiedea nuttallii*; *Sesbania tomentosa*; *Solanum incompletum*; *Spermolepis hawaiiensis*; *Tetramolopium remyi*; *Vigna o-wahuensis*; and *Zanthoxylum hawaiiense* (64 FR 48307, 68 FR 1219, 68 FR 9115, 68 FR 12981).

Due to low numbers of individuals and/or populations and their inherent immobility, the other 24 plants may be vulnerable to unrestricted collection, vandalism, or disturbance. However, we examined the evidence available for these taxa and have not, at this time, found specific evidence of taking, vandalism, collection or trade of these taxa or of similar species. Consequently, while we remain concerned that these activities could potentially threaten these 24 plant species in the future, consistent with applicable regulations (50 CFR 424.12(a)(1)(i)) and the court's discussion of these regulations, we do not find that any of these species are currently threatened by taking or other human activity, which would be exacerbated by the designation of critical habitat.

In the absence of finding that critical habitat would increase threats to a species, if there are any benefits to critical habitat designation, then a prudent finding is warranted. The potential benefits include: (1) Triggering section 7 consultation in new areas where it would not otherwise occur; (2) focusing conservation activities on the most essential area; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species.

In the case of these 24 species, there would be some benefits to critical habitat. The primary regulatory effect of critical habitat is the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely affects critical habitat. Thirteen of these species are reported on or near Federal lands (see Table 2 above, under "Discussion of Plant Taxa"), where actions are subject to section 7 consultation. Although a majority of the species considered in this rule are located exclusively on non-Federal lands with limited Federal activities, there could be Federal actions affecting these lands in the future. While a critical habitat designation for habitat currently occupied by these species would not likely change the section 7 consultation outcome, since an action that destroys or adversely modifies such critical habitat would also be likely to result in jeopardy to the species, there may be instances where section 7 consultation would be triggered only if critical habitat were designated. There would also be some educational or informational benefits to the designation of critical habitat. Benefits of designation would include the notification of land owners, land managers, and the general public of the importance of protecting the habitat of

these species and dissemination of information regarding their essential habitat requirements.

Therefore, we believe that the designation of critical habitat is prudent for these 24 plant species:

*Argyroxiphium sandwicense* ssp. *macrocephalum*; *Asplenium fragile* var. *insulare*; *Clermontia lindseyana*; *Clermontia peleana*; *Colubrina oppositifolia*; *Cyanea mceldowneyi*; *Dubautia plantaginea* ssp. *humilis*; *Geranium arboreum*; *Geranium multiflorum*; *Gouania vitifolia*; *Hedyotis coriacea*; *Hesperomannia arbuscula*; *Lipochaeta kamolensis*; *Lysimachia lydgatei*; *Melicope adscendens*; *Melicope balloui*; *Melicope ovalis*; *Nototrichium humile*; *Remya mauiensis*; *Sanicula purpurea*; *Schiedea haleakalensis*; *Schiedea hookeri*; *Tetramolopium arenarium*; and *Tetramolopium capillare* because the potential benefits of critical habitat designation outweigh the potential threats.

#### Methods

As required by the Act and regulations (section 4(b)(2) and 50 CFR 424.12), we used the best scientific information available to determine areas that contain the physical and biological features that are essential for the conservation of *Adenophorus periens*, *Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonoides*, *Centaurium sebaeoides*, *Clermontia lindseyana*, *Clermontia oblongifolia* ssp. *mauiensis*, *Clermontia samuelii*, *Clermontia peleana*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea copelandii* ssp. *haleakalaensis*, *Cyanea glabra*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea hamatiflora* ssp. *hamatiflora*, *Cyanea lobata*, *Cyanea mceldowneyi*, *Cyrtandra munroi*, *Delissea undulata*, *Diellia erecta*, *Diplazium molokaiense*, *Dubautia plantaginea* ssp. *humilis*, *Flueggea neowawraea*, *Geranium arboreum*, *Geranium multiflorum*, *Gouania vitifolia*, *Hedyotis coriacea*, *Hedyotis mannii*, *Hesperomannia arborescens*, *Hesperomannia arbuscula*, *Hibiscus brackenridgei*, *Ischaemum byrsonae*, *Isodendron pyrifolium*, *Kanaloa kahoolawensis*, *Lipochaeta kamolensis*, *Lysimachia lydgatei*, *Mariscus pennatifolius*, *Melicope adscendens*, *Melicope balloui*, *Melicope knudsenii*, *Melicope mucronulata*, *Melicope ovalis*, *Neraudia sericea*, *Nototrichium humile*, *Peucedanum sandwicense*, *Phlegmariurus mannii*, *Phyllostegia mannii*, *Phyllostegia mollis*,

*Phyllostegia parviflora*, *Plantago princeps*, *Platanthera holochila*, *Pteris lidgatei*, *Remya mauiensis*, *Sanicula purpurea*, *Schiedea haleakalensis*, *Schiedea hookeri*, *Schiedea nuttallii*, *Sesbania tomentosa*, *Solanum incompletum*, *Spermolepis hawaiiensis*, *Tetramolopium arenarium*, *Tetramolopium capillare*, *Tetramolopium remyi*, *Vigna owahuensis*, and *Zanthoxylum hawaiiense*. This information included the known locations, site-specific species information from the HINHP database and our own rare plant database; species information from the Center for Plant Conservation's (CPC's) rare plant monitoring database housed at the University of Hawaii's Lyon Arboretum; island-wide Geographic Information System (GIS) coverages (e.g., vegetation, soils, annual rainfall, elevation contours, land ownership); the final listing rules for these 69 species; the December 18, 2000, proposal; the April 3, 2002, revised proposal; information received during the public comment periods and the public hearings; recent biological surveys and reports; our recovery plans for these species; any species and management information received from landowners, land managers, and interested parties for the islands of Maui and Kahoolawe; discussions with botanical experts; and recommendations from the Hawaii and Pacific Plant Recovery Coordinating Committee (HPPRCC) (see also the discussion below) (GDSI 2000; HINHP Database 2000; HPPRCC 1998; Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; 65 FR 66808; 67 FR 3940; CPC, *in litt.* 1999).

In 1994, the HPPRCC initiated an effort to identify and map habitat believed to be important for the recovery of 282 endangered and threatened Hawaiian plant species. The HPPRCC identified these areas on most of the islands in the Hawaiian chain, and in 1999, we published them in our *Recovery Plan for the Multi-Island Plants* (Service 1999). The HPPRCC expects there will be subsequent efforts to further refine the locations of important habitat areas and that new survey information or research may also lead to additional refinement of identifying and mapping of habitat important for the recovery of these species.

The HPPRCC identified essential habitat areas for all listed, proposed, and candidate plants and evaluated species of concern to determine if essential habitat areas would provide for their habitat needs. However, the HPPRCC's mapping of habitat is distinct from the regulatory designation of

critical habitat as defined by the Act. More data have been collected since the recommendations made by the HPPRCC in 1998. Much of the area that was identified by the HPPRCC as inadequately surveyed has now been surveyed to some degree. New location data for many species have been gathered. Also, the HPPRCC identified areas as essential based on species clusters (areas that included listed species, as well as candidate species and species of concern) while we have only delineated areas that are essential for the conservation of the specific listed species at issue. As a result, the critical habitat designations in this rule include not only some habitat that was identified as essential in the 1998 recommendations but also habitat that was not identified as essential in those recommendations.

#### Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we are required to base critical habitat determinations on the best scientific and commercial data available and to consider those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection. These features include, but are not limited to: Space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Much of what is known about the specific physical and biological requirements of *Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bidens micrantha* ssp. *kalealaha*, *Bonamia menziesii*, *Brighamia rockii*, *Cenchrus agrimonoides*, *Centaurium sebaeoides*, *Clermontia lindseyana*, *Clermontia oblongifolia* ssp. *mauiensis*, *Clermontia samuelii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea copelandii* ssp. *haleakalaensis*, *Cyanea glabra*, *Cyanea grimesiana* ssp. *grimesiana*, *Cyanea hamatiflora* ssp. *hamatiflora*, *Cyanea lobata*, *Cyanea mceldowneyi*, *Cyrtandra munroi*, *Diellia erecta*, *Diplazium molokaiense*, *Dubautia plantaginea* ssp. *humilis*, *Flueggea*

*neowawraea*, *Geranium arboreum*, *Geranium multiflorum*, *Gouania vitifolia*, *Hedyotis coriacea*, *Hedyotis mannii*, *Hesperomannia arbuscula*, *Hibiscus brackenridgei*, *Ischaemum byrnone*, *Isodendron pyrifolium*, *Kanaloa kahoolawensis*, *Lipochaeta kamolensis*, *Lysimachia lydgatei*, *Mariscus pennatifolius*, *Melicope adscendens*, *Melicope balloui*, *Melicope knudsenii*, *Melicope mucronulata*, *Melicope ovalis*, *Neraudia sericea*, *Nototrichium humile*, *Peucedanum sandwicense*, *Phlegmariurus mannii*, *Phyllostegia mannii*, *Phyllostegia mollis*, *Plantago princeps*, *Platanthera holochila*, *Pteris lidgatei*, *Remya muiensis*, *Sanicula purpurea*, *Schiedea haleakalensis*, *Sesbania tomentosa*, *Spermolepis hawaiiensis*, *Tetramolopium capillare*, *Tetramolopium remyi*, *Vigna owahuensis*, and *Zanthoxylum hawaiiense* is described in the "Background" section of this final rule.

We are unable to identify these features for *Adenophorus periens*, *Clermontia peleana*, *Delissea undulata*, *Phyllostegia parviflora*, *Schiedea hookeri*, *Schiedea nuttallii*, *Solanum incompletum*, and *Tetramolopium arenarium*, which no longer occur on the islands of Maui and Kahoolawe, because information on the physical and biological features (*i.e.*, the primary constituent elements) that are considered essential to the conservation of these eight species on Maui and Kahoolawe is not known. Therefore, we are not designating critical habitat for these species on Maui. We are able to identify these features for *Hesperomannia arborescens*, but we are not designating critical habitat for this species on Maui for the reasons given in the "Analysis of Impacts Under Section 4(b)(2): Other Impacts" section.

All areas designated as critical habitat are within the historical range of the 60 species at issue and contain one or more of the physical or biological features (primary constituent elements) essential for the conservation of the species.

As described in the discussions for each of the 60 species for which we are designating critical habitat, we are defining the primary constituent elements on the basis of the habitat features of the areas from which the plant species are reported, as described by the type of plant community (*e.g.*, mesic *Metrosideros polymorpha* forest), associated native plant species, locale information (*e.g.*, steep rocky cliffs, talus slopes, gulches, stream banks), and elevation. The habitat features provide the ecological components required by the plant. The type of plant community and associated native plant species

indicate specific microclimate (localized climatic) conditions, retention and availability of water in the soil, soil microorganism community, and nutrient cycling and availability. The locale indicates information on soil type, elevation, rainfall regime, and temperature. Elevation indicates information on daily and seasonal temperature and sun intensity. Therefore, the descriptions of the physical elements of the locations of each of these species, including habitat type, plant communities associated with the species, location, and elevation, as described in the "Supplementary Information: Discussion of the Plant Taxa" section above, constitute the primary constituent elements for these species on the islands of Maui and Kahoolawe.

#### Criteria Used To Identify Critical Habitat

The lack of detailed scientific data on the life history of these plant species makes it impossible for us to develop a robust quantitative model (*e.g.*, population viability analysis (National Research Council 1995)) to identify the optimal number, size, and location of critical habitat units to achieve recovery (Beissinger and Westphal 1998; Burgman *et al.* 2001; Ginzburg *et al.* 1990; Karieva and Wennergren 1995; Menges 1990; Murphy *et al.* 1990; Taylor 1995). However, based on the best information available at this time, including information on which the listing of these species was based, as well as their recovery plans, we have concluded that the current size and distribution of the extant populations are not sufficient to expect a reasonable probability of long-term survival and recovery of these plant species.

For each of these species, the overall recovery strategy outlined in the approved recovery plans includes: (1) Stabilization of existing wild populations; (2) protection and management of habitat; (3) enhancement of existing small populations and reestablishment of new populations within historic range; and (4) research on species biology and ecology (Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). Thus, the long-term recovery of these species is dependent upon the protection of existing population sites and potentially suitable unoccupied habitat within their historic range.

The overall recovery goal stated in the recovery plans for each of these species includes the establishment of 8 to 10 populations with a minimum of 100 mature, reproducing individuals per population for long-lived perennials,

300 mature, reproducing individuals per population for short-lived perennials, and 500 mature, reproducing individuals per population for annuals. (There is one specific exception to this general recovery goal of 8 to 10 populations for species that are believed to be very narrowly distributed on a single island. The recovery goal for *Argyroxiphium sandwicense* ssp. *macrocephalum* is one population of more than 50,000 individuals, and the critical habitat designations reflect this exception for this species.)

To be considered recovered, the populations of a multi-island species should be distributed among the islands of its known historic range (Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). A population, for the purposes of this discussion and as defined in the recovery plans for these species, is a unit in which the individuals could be regularly cross-pollinated and influenced by the same small-scale events (such as landslides), and that contains a minimum of 100, 300, or 500 mature, reproducing individuals, depending on whether the species is a long-lived perennial, short-lived perennial, or annual.

By adopting the specific recovery objectives enumerated above, the adverse effects of genetic inbreeding and random environmental events and catastrophes, such as landslides, hurricanes, or tsunamis, which could destroy a large percentage of a species at any one time, may be reduced (Menges 1990; Podolsky 2001). These recovery objectives were initially developed by the HPPRCC and are found in all of the recovery plans for these species. While they are expected to be further refined as more information on the population biology of each species becomes available, the justification for these objectives is found in the current conservation biology literature addressing the conservation of rare and endangered plants and animals (Beissinger and Westphal 1998; Burgman *et al.* 2001; Falk *et al.* 1996; Ginzburg *et al.* 1990; Hendrix and Kyhl 2000; Karieva and Wennergren 1995; Luijten *et al.* 2000; Meffe and Carroll 1996; Menges 1990; Murphy *et al.* 1990; Podolsky 2001; Quintana-Ascencio and Menges 1996; Taylor 1995; Tear *et al.* 1995; Wolf and Harrison 2001). The overall goal of recovery in the short-term is a successful population that can carry on basic life history processes, such as establishment, reproduction, and dispersal, at a level where the probability of extinction is low. In the long-term, the species and its populations should be at a reduced risk

of extinction and be adaptable to environmental change through evolution and migration.

Many aspects of a species' life history are typically considered to determine guidelines for its interim stability and recovery, including longevity, breeding system, growth form, fecundity, ramet (a plant that is an independent member of a clone) production, survivorship, seed longevity, environmental variation, and successional stage of the habitat. Hawaiian species are poorly studied, and the only one of these characteristics that can be uniformly applied to all Hawaiian plant species is longevity (*i.e.*, long-lived perennial, short-lived perennial, and annual). In general, long-lived woody perennial species would be expected to be viable at population levels of 50 to 250 individuals per population, while short-lived perennial species would be viable at population levels of 1,500 to 2,500 individuals or more per population. These population numbers were refined for Hawaiian plant species by the HPPRCC (1994) due to the restricted distribution of suitable habitat typical of Hawaiian plants and the likelihood of smaller genetic diversity of several species that evolved from one single introduction. For recovery of Hawaiian plants, the HPPRCC recommended a general recovery guideline of 100 mature, reproducing individuals per population for long-lived perennial species, 300 mature, reproducing individuals per population for short-lived perennial species, and 500 mature, reproducing individuals per population for annual species.

The HPPRCC also recommended the conservation and establishment of 8 to 10 populations to address the numerous risks to the long-term survival and conservation of Hawaiian plant species. Although absent the detailed information inherent to the types of population viability analysis models described above (Burgman *et al.* 2001), this approach employs two widely recognized and scientifically accepted goals for promoting viable populations of listed species: (1) Creation or maintenance of multiple populations so that a single or series of catastrophic events cannot destroy the entire listed species (Luijten *et al.* 2000; Menges 1990; Quintana-Ascencio and Menges 1996); and (2) increasing the size of each population in the respective critical habitat units to a level where the threats of genetic, demographic, and normal environmental uncertainties are diminished (Hendrix and Kyhl 2000; Luijten *et al.* 2000; Meffe and Carroll 1996; Podolsky 2001; Service 1997; Tear *et al.* 1995; Wolf and Harrison 2001). In

general, the larger the number of populations and the larger the size of each population, the lower the probability of extinction (Meffe and Carroll 1996; Raup 1991). This basic conservation principle of redundancy applies to Hawaiian plant species. By maintaining 8 to 10 viable populations in several critical habitat units, the threats represented by a fluctuating environment are alleviated and the species has a greater likelihood of achieving long-term survival and recovery. Conversely, loss of one or more of the plant populations within any critical habitat unit could result in an increase in the risk that the entire listed species may not survive and recover.

Due to the reduced size of suitable habitat areas for these Hawaiian plant species, they are now more susceptible to the variations and weather fluctuations affecting quality and quantity of available habitat, as well as direct pressure from hundreds of species of nonnative plants and animals. Establishing and conserving 8 to 10 viable populations on one or more islands within the historic range of the species will provide each species with a reasonable expectation of persistence and eventual recovery, even with the high potential that one or more of these populations will be eliminated by normal or random adverse events, such as the hurricanes that occurred in 1982 and 1992 on Kauai, fires, and nonnative plant invasions (HPPRCC 1994; Luijten *et al.* 2000; Mangel and Tier 1994; Pimm *et al.* 1998; Stacey and Taper 1992). We conclude that designation of adequate suitable habitat for 8 to 10 populations as critical habitat is essential to give the species a reasonable likelihood of long-term survival and conservation, based on currently available information.

In summary, the long-term survival and conservation of Hawaiian plant species requires the designation of critical habitat units on one or more of the Hawaiian islands with suitable habitat for 8 to 10 populations of each plant species. Some of this habitat is currently not known to be occupied by these species. To recover the species, it is essential to conserve suitable habitat in these unoccupied units, which in turn will allow for the establishment of additional populations through natural recruitment or managed reintroductions. Establishment of these additional populations will increase the likelihood that the species will survive and recover in the face of normal and stochastic events (*e.g.*, hurricanes, fire, and nonnative species introductions) (Mangel and Tier 1994; Pimm *et al.* 1998; Stacey and Taper 1992).

In this rule, we have defined the primary constituent elements based on the general habitat features of the areas from which the plants are reported, such as the type of plant community, the associated native plant species, the physical location (*e.g.*, steep rocky cliffs, talus slopes, stream banks), and elevation. The areas we are designating as critical habitat provide some or all of the habitat components essential for the conservation of the 60 plant species.

Our approach to delineating critical habitat units was applied in the following manner:

(1) Critical habitat was proposed and will be designated on an island by island basis for ease of understanding for landowners and the public, for ease of conducting the public hearing process, and for ease of conducting public outreach. In Hawaii, landowners and the public are most interested and affected by issues centered on the island on which they reside.

(2) We focused on designating units representative of the known current and historical geographic and elevational range of each species; and

(3) We designated critical habitat units to allow for expansion of existing wild populations and reestablishment of wild populations within the historic range, as recommended by the recovery plans for each species.

The proposed critical habitat units were delineated by creating rough units for each species by screen digitizing polygons (map units) using ArcView (Environmental Systems Research Institute, Inc.), a computer GIS program. The polygons were created by overlaying current and historic plant location points onto digital topographic maps of each of the islands.

The resulting shape files (delineating historic elevational range and potentially suitable habitat) were then evaluated. Elevation ranges were further refined and land areas identified as not suitable for a particular species (*i.e.*, not containing the primary constituent elements) were avoided. The resulting shape files for each species were then considered to define all suitable habitat on the island, including occupied and unoccupied habitat.

These shape files of suitable habitat were further evaluated. Several factors were used to delineate the proposed critical habitat units from these land areas. We reviewed the recovery objectives as described above and in recovery plans for each of the species to determine if the number of populations and population size requirements needed for conservation would be available within the suitable habitat units identified as containing the

appropriate primary constituent elements for each species. If more than the area needed for the number of recovery populations was identified as potentially suitable, only those areas within the least disturbed suitable habitat were included as proposed critical habitat. A population for this purpose is defined as a discrete aggregation of individuals located a sufficient distance from a neighboring aggregation such that the two are not affected by the same small-scale events and are not believed to be consistently cross-pollinated. In the absence of more specific information indicating the appropriate distance to assure limited cross-pollination, we are using a distance of 1,000 m (3,280 ft) based on our review of current literature on gene flow (Barret and Kohn 1991; Fenster and Dudash 1994; Havens 1998; Schierup and Christiansen 1996).

The resulting critical habitat units were further refined by using satellite imagery and parcel data to eliminate areas that did not contain the appropriate vegetation or associated native plant species, as well as features such as cultivated agriculture fields, housing developments, and other areas that are unlikely to contribute to the conservation of one or more of the 61 plant species for which critical habitat was proposed on April 3, 2002. Geographic features (ridge lines, valleys, streams, coastlines, etc.) or manmade features (roads or obvious land use) that created an obvious boundary for a unit were used as unit area boundaries.

Following publication of the proposed critical habitat rules, some of which were revised, for 255 Hawaiian plants (67 FR 3940, 67 FR 9806, 67 FR 15856, 67 FR 16492, 67 FR 34522, 67 FR 36968, 67 FR 37108), we re-evaluated proposed critical habitat, Statewide, for each species using the applicable recovery guidelines (generally 8 to 10 populations with a minimum of 100 mature, reproducing individuals per population for long-lived perennials; 300 mature, reproducing individuals per population for short-lived perennials; and 500 mature, reproducing individuals per population for annuals) to determine if we had inadvertently proposed for designation too much or too little habitat to meet the essential recovery goals of 8 to 10 populations per species distributed among the islands of

the species' known historic range (HINHP Database 2000, 2001; Wagner *et al.* 1990, 1999).

Based on comments and information we received during the comment periods, we assessed the proposed critical habitat in order to ascertain which areas contained the highest quality habitat, had the highest likelihood of species conservation, and were geographically distributed within the species' historical range and located a sufficient distance from each other such that populations of a single species are unlikely to be impacted by a single catastrophic event. We ranked areas of the proposed critical habitat by the quality of the primary constituent elements (*e.g.*, intact native plant communities, predominance of associated native plants versus nonnative plants), potential as a conservation area (*e.g.*, whether the land is zoned for conservation or whether the landowner is already participating in plant conservation actions), and current or expected management of known threats (*e.g.*, ungulate control; weed control; nonnative insect, slug, and snail control). Areas that are zoned for conservation or have been identified as a State Forest Reserve, NAR, Wildlife Preserve, State Park, or are managed for conservation by a private landowner have a high likelihood of providing conservation benefit to the species and are therefore more essential than other comparable habitat outside of those types of areas.

Areas that contain high quality primary constituent elements and conservation potential (*e.g.*, are zoned for conservation and have ongoing or expected threat abatement actions) were ranked the most essential. This ranking process also included determining which habitats were representative of the historic geographical and ecological distributions of the species (see "Primary Constituent Elements"). Of these most essential areas, we selected adequate area to provide for 8 to 10 populations distributed among the islands of each species' historical range. Of the proposed critical habitat for a species, areas that were not ranked most essential to provide habitat for populations above the recovery goal of 8 to 10 populations were determined not essential for the conservation of the

species and were excluded from the final designation.

In selecting areas of designated critical habitat, we made an effort to avoid developed areas, such as towns and other similar lands, that are unlikely to contribute to the conservation of the 60 species. However, the minimum mapping unit that we used to approximate our delineation of critical habitat for these species did not allow us to exclude all such developed areas from the maps. In addition, existing manmade features and structures within the boundaries of the mapped unit, such as buildings; roads; aqueducts and other water system features—including but not limited to pumping stations, irrigation ditches, pipelines, siphons, tunnels, water tanks, gaging stations, intakes, reservoirs, diversions, flumes, and wells; existing trails; campgrounds and their immediate surrounding landscaped area; scenic lookouts; remote helicopter landing sites; existing fences; telecommunications towers and associated structures and equipment; electrical transmission lines and distribution, and communication facilities and regularly maintained associated rights-of-way and access ways; radars, and telemetry antennas; missile launch sites; arboreta and gardens; heiau (indigenous places of worship or shrines) and other archaeological sites; airports; other paved areas; and lawns and other rural residential landscaped areas do not contain one or more of the primary constituent elements and are therefore excluded under the terms of the final regulation. Federal actions limited to those areas would not trigger a section 7 consultation unless they affect the species or primary constituent elements in adjacent critical habitat.

In summary, for these species we utilized the approved recovery plan guidance to identify appropriately sized land units containing essential occupied and unoccupied habitat. Based on the best available information, we believe these areas constitute the essential habitat on Maui and Kahoolawe to provide for the recovery of these 60 species.

The approximate areas of the designated critical habitat by land ownership or jurisdiction are shown in Table 4.



TABLE 4.—APPROXIMATE CRITICAL HABITAT DESIGNATED AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, MAUI COUNTY, HAWAII

Unit name	State/local	Private	Federal	Total
Maui 1— <i>Centaurium sebaeoides</i> —a	70 ha (174 ac)	<1 ha (<1 ac)		70 ha (174 ac)
Maui 1— <i>Sesbania tomentosa</i> —a	38 ha (94 ac)	<1 ha (<1 ac)		38 ha (94 ac)
Maui 2— <i>Brighamia rockii</i> —a	5 ha (14 ac)	<1 ha (<1 ac)		5 ha (14 ac)
Maui 2— <i>Brighamia rockii</i> —b	17 ha (42 ac)	<1 ha (<1 ac)		17 ha (42 ac)
Maui 2— <i>Centaurium sebaeoides</i> —b	14 ha (35 ac)	12 ha (30 ac)		26 ha (65 ac)
Maui 3— <i>Brighamia rockii</i> —c	<1 ha (<1 ac)	3 ha (9 ac)		3 ha (9 ac)
Maui 4— <i>Brighamia rockii</i> —d	1 ha (2 ac)			1 ha (2 ac)
Maui 4— <i>Peucedanum sandwicense</i> —a	1 ha (2 ac)			1 ha (2 ac)
Maui 5— <i>Brighamia rockii</i> —e	7 ha (16 ac)			7 ha (16 ac)
Maui 6— <i>Ischaemum byrnone</i> —a	15 ha (35 ac)	3 ha (7 ac)		18 ha (42 ac)
Maui 6— <i>Mariscus pennatifolius</i> —a	17 ha (40 ac)	13 ha (34 ac)		30 ha (74 ac)
Maui 7— <i>Ischaemum byrnone</i> —b	11 ha (27 ac)			11 ha (27 ac)
Maui 8— <i>Cyanea copelandii</i> ssp. <i>haleakalaensis</i> —a	5 ha (13 ac)	496 ha (1,225 ac)		501 ha (1,238 ac)
Maui 8— <i>Cyanea glabra</i> —a	448 ha (1,108 ac)	2 ha (4 ac)		450 ha (1,112 ac)
Maui 8— <i>Cyanea hamatiflora</i> ssp. <i>hamatiflora</i> —a	48 ha (119 ac)	563 ha (1,390 ac)		611 ha (1,509 ac)
Maui 8— <i>Cyanea mceldowneyi</i> —a	489 ha (1,208 ac)	1,638 ha (4,047 ac)		2,127 ha (5,255 ac)
Maui 8— <i>Diplazium molokaiense</i> —a	87 ha (214 ac)	488 ha (1,206 ac)		575 ha (1,420 ac)
Maui 8— <i>Geranium multiflorum</i> —a		46 ha (113 ac)		46 ha (113 ac)
Maui 8— <i>Melicope balloui</i> —a	73 ha (181 ac)	78 ha (192 ac)		151 ha (373 ac)
Maui 8— <i>Phlegmariurus mannii</i> —a	101 ha (251 ac)	120 ha (297 ac)		221 ha (548 ac)
Maui 8— <i>Phyllostegia mannii</i> —a	2 ha (4 ac)	568 ha (1,404 ac)		570 ha (1,408 ac)
Maui 8— <i>Phyllostegia mollis</i> —a	128 ha (316 ac)			128 ha (316 ac)
Maui 8— <i>Zanthoxylum hawaiiense</i> —a	362 ha (894 ac)	1 ha (1 ac)		363 ha (895 ac)
Maui 9— <i>Alectryon macrococcus</i> —a	1,893 ha (4,678 ac)	<1 ha (<1 ac)		1,893 ha (4,678 ac)
Maui 9— <i>Argyroxiphium sandwicense</i> ssp. <i>macrocephalum</i> —a	2,117 ha (5,232 ac)	852 ha (2,105 ac)	5,996 ha (14,816 ac)	8,965 ha (22,153 ac)
Maui 9— <i>Asplenium fragile</i> var. <i>insulare</i> —a			362 ha (894 ac)	362 ha (894 ac)
Maui 9— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —a	390 ha (965 ac)	629 ha (1,554 ac)	543 ha (1,343 ac)	1,562 ha (3,862 ac)
Maui 9— <i>Bidens micrantha</i> ssp. <i>kalealaha</i> —b	2,115 ha (5,229 ac)			2,115 ha (5,229 ac)
Maui 9— <i>Clermontia lindseyana</i> —a	177 ha (438 ac)			177 ha (438 ac)
Maui 9— <i>Clermontia lindseyana</i> —b	60 ha (149 ac)			60 ha (149 ac)
Maui 9— <i>Clermontia samuelii</i> —a	2,777 ha (6,863 ac)		353 ha (872 ac)	3,130 ha (7,735 ac)
Maui 9— <i>Cyanea copelandii</i> ssp. <i>haleakalaensis</i> —b	391 ha (966 ac)		1,318 ha (3,258 ac)	1,709 ha (4,224 ac)
Maui 9— <i>Cyanea glabra</i> —b			649 ha (1,605 ac)	649 ha (1,605 ac)
Maui 9— <i>Cyanea glabra</i> —c	363 ha (897 ac)			363 ha (897 ac)
Maui 9— <i>Cyanea hamatiflora</i> ssp. <i>hamatiflora</i> —b	203 ha (503 ac)		1,107 ha (2,732 ac)	1,310 ha (3,235 ac)
Maui 9— <i>Diellia erecta</i> —a	2 ha (6 ac)			2 ha (6 ac)
Maui 9— <i>Diellia erecta</i> —b	174 ha (432 ac)			174 ha (432 ac)
Maui 9— <i>Diplazium molokaiense</i> —b	162 ha (401 ac)			162 ha (401 ac)
Maui 9— <i>Flueggea neowawraea</i> —a	52 ha (128 ac)			52 ha (128 ac)
Maui 9— <i>Geranium arboreum</i> —a	731 ha (1,806 ac)			731 ha (1,806 ac)
Maui 9— <i>Geranium multiflorum</i> —b	322 ha (795 ac)	297 ha (735 ac)	4,198 ha (10,372 ac)	4,817 ha (11,902 ac)
Maui 9— <i>Geranium multiflorum</i> —c	183 ha (450 ac)			183 ha (450 ac)
Maui 9— <i>Lipochaeta kamolensis</i> —a	1,472 ha (3,638 ac)	2 ha (6 ac)		1,474 ha (3,644 ac)
Maui 9— <i>Melicope balloui</i> —b			394 ha (972 ac)	394 ha (972 ac)
Maui 9— <i>Melicope knudsenii</i> —a	28 ha (69 ac)			28 ha (69 ac)
Maui 9— <i>Melicope mucronulata</i> —a	34 ha (83 ac)			34 ha (83 ac)
Maui 9— <i>Melicope ovalis</i> —a	1 ha (2 ac)		933 ha (2,304 ac)	934 ha (2,306 ac)
Maui 9— <i>Neraudia sericea</i> —a	623 ha (1,539 ac)			623 ha (1,539 ac)
Maui 9— <i>Nototrichium humile</i> —a	382 ha (944 ac)	15 ha (38 ac)		397 ha (982 ac)
Maui 9— <i>Phlegmariurus mannii</i> —b	383 ha (947 ac)			383 ha (947 ac)
Maui 9— <i>Phlegmariurus mannii</i> —c	224 ha (554 ac)		252 ha (622 ac)	476 ha (1,176 ac)
Maui 9— <i>Phyllostegia mollis</i> —b	509 ha (1,256 ac)			509 ha (1,256 ac)
Maui 9— <i>Plantago princeps</i> —a			164 ha (406 ac)	164 ha (406 ac)
Maui 9— <i>Platanthera holochila</i> —a	32 ha (80 ac)		208 ha (516 ac)	240 ha (596 ac)
Maui 9— <i>Schiedea haleakalensis</i> —a			26 ha (64 ac)	26 ha (64 ac)
Maui 9— <i>Schiedea haleakalensis</i> —b			77 ha (189 ac)	77 ha (189 ac)
Maui 10— <i>Alectryon macrococcus</i> —b	372 ha (918 ac)	30 ha (75 ac)		402 ha (993 ac)
Maui 11— <i>Lipochaeta kamolensis</i> —b	42 ha (105 ac)			42 ha (105 ac)
Maui 12— <i>Vigna o-wahuensis</i> —a	144 ha (356 ac)			144 ha (356 ac)
Maui 13— <i>Alectryon macrococcus</i> —c	419 ha (1,033 ac)			419 ha (1,033 ac)
Maui 13— <i>Bonamia menziesii</i> —a	536 ha (1,325 ac)			536 ha (1,325 ac)

TABLE 4.—APPROXIMATE CRITICAL HABITAT DESIGNATED AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, MAUI COUNTY, HAWAII—Continued

Unit name	State/local	Private	Federal	Total
Maui 13— <i>Cenchrus agrimonioides</i> —a.	237 ha (585 ac) .....	.....	.....	237 ha (585 ac)
Maui 13— <i>Colubrina oppositifolia</i> —a	739 ha (1,827 ac) .....	.....	.....	739 ha (1,827 ac)
Maui 13— <i>Flueggea neowawraea</i> —b	50 ha (124 ac) .....	.....	.....	50 ha (124 ac)
Maui 13— <i>Melicope adscendens</i> —a ..	160 ha (398 ac) .....	.....	.....	160 ha (398 ac)
Maui 13— <i>Melicope knudsenii</i> —b .....	163 ha (403 ac) .....	.....	.....	163 ha (403 ac)
Maui 13— <i>Melicope mucronulata</i> —b	194 ha (481 ac) .....	.....	.....	194 ha (481 ac)
Maui 13— <i>Sesbania tomentosa</i> —b ....	78 ha (193 ac) .....	1 ha (2 ac) .....	.....	79 ha (195 ac)
Maui 13— <i>Spermolepis hawaiiensis</i> —a.	91 ha (224 ac) .....	.....	.....	91 ha (224 ac)
Maui 14— <i>Geranium arboreum</i> —b ....	282 ha (697 ac) .....	170 ha (418 ac) .....	.....	452 ha (1,115 ac)
Maui 15— <i>Geranium arboreum</i> —c ....	177 ha (437 ac) .....	490 ha (1,211 ac) .....	.....	667 ha (1,648 ac)
Maui 16— <i>Hibiscus brackenridgei</i> —a ..	.....	212 ha (524 ac) .....	.....	212 ha (524 ac)
Maui 17— <i>Alectryon macrococcus</i> —d	209 ha (517 ac) .....	181 ha (448 ac) .....	.....	390 ha (965 ac)
Maui 17— <i>Alectryon macrococcus</i> —e	110 ha (270 ac) .....	<1 ha (1 ac) .....	.....	110 ha (271 ac)
Maui 17— <i>Cenchrus agrimonioides</i> —b.	118 ha (292 ac) .....	<1 ha (1 ac) .....	.....	118 ha (293 ac)
Maui 17— <i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> —a.	16 ha (40 ac) .....	<1 ha (<1 ac) .....	.....	16 ha (40 ac)
Maui 17— <i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> —b.	696 ha (1,720 ac) .....	<1 ha (<1 ac) .....	.....	696 ha (1,720 ac)
Maui 17— <i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> —c.	293 ha (726 ac) .....	<2 ha (6 ac) .....	.....	295 ha (732 ac)
Maui 17— <i>Colubrina oppositifolia</i> —b	132 ha (327 ac) .....	44 ha (108 ac) .....	.....	176 ha (435 ac)
Maui 17— <i>Ctenitis squamigera</i> —a .....	953 ha (2,356 ac) .....	1,026 ha (2,534 ac) .....	.....	1,979 ha (4,890 ac)
Maui 17— <i>Ctenitis squamigera</i> —b .....	478 ha (1,181 ac) .....	338 ha (837 ac) .....	.....	816 ha (2,018 ac)
Maui 17— <i>Ctenitis squamigera</i> —c .....	137 ha (336 ac) .....	<1 ha (1 ac) .....	.....	137 ha (337 ac)
Maui 17— <i>Cyanea glabra</i> —d .....	255 ha (630 ac) .....	.....	.....	255 ha (630 ac)
Maui 17— <i>Cyanea glabra</i> —e .....	264 ha (652 ac) .....	207 ha (511 ac) .....	.....	471 ha (1,163 ac)
Maui 17— <i>Cyanea glabra</i> —f .....	188 ha (463 ac) .....	<1 ha (1 ac) .....	.....	188 ha (464 ac)
Maui 17— <i>Cyanea glabra</i> —g .....	.....	79 ha (194 ac) .....	.....	79 ha (194 ac)
Maui 17— <i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> —a.	10 ha (24 ac) .....	911 ha (2,249 ac) .....	.....	921 ha (2,273 ac)
Maui 17— <i>Cyanea lobata</i> —a .....	132 ha (322 ac) .....	<1 ha (1 ac) .....	.....	132 ha (323 ac)
Maui 17— <i>Cyanea lobata</i> —b .....	112 ha (276 ac) .....	2 ha (5ac) .....	.....	114 ha (281 ac)
Maui 17— <i>Cyanea lobata</i> —c .....	578 ha (1,427 ac) .....	<1 ha (<1 ac) .....	.....	578 ha (1,427 ac)
Maui 17— <i>Cyrtandra munroi</i> —a .....	156 ha (385 ac) .....	<1 ha (1 ac) .....	.....	156 ha (386 ac)
Maui 17— <i>Cyrtandra munroi</i> —b .....	25 ha (62 ac) .....	213 ha (528 ac) .....	.....	238 ha (590 ac)
Maui 17— <i>Cyrtandra munroi</i> —c .....	603 ha (1,490 ac) .....	<1 ha (<1 ac) .....	.....	603 ha (1,490 ac)
Maui 17— <i>Diellia erecta</i> —c .....	22 ha (55 ac) .....	.....	.....	22 ha (55 ac)
Maui 17— <i>Diellia erecta</i> —d .....	.....	70 ha (172 ac) .....	.....	70 ha (172 ac)
Maui 17— <i>Diellia erecta</i> —e .....	12 ha (30 ac) .....	.....	.....	12 ha (30 ac)
Maui 17— <i>Diellia erecta</i> —f .....	14 ha (34 ac) .....	.....	.....	14 ha (34 ac)
Maui 17— <i>Diplazium molokaiense</i> —c	30 ha (74 ac) .....	1,465 ha (3,619 ac) .....	.....	1,495 ha (3,693 ac)
Maui 17— <i>Dubautia plantaginea</i> ssp. <i>humilis</i> —a.	66 ha (164 ac) .....	227 ha (550 ac) .....	.....	293 ha (723 ac)
Maui 17— <i>Dubautia plantaginea</i> ssp. <i>humilis</i> —b.	68 ha (168 ac) .....	46 ha (115 ac) .....	.....	114 ha (283 ac)
Maui 17— <i>Dubautia plantaginea</i> ssp. <i>humilis</i> —c.	27 ha (66 ac) .....	68 ha (168 ac) .....	.....	95 ha (234 ac)
Maui 17— <i>Gouania vitifolia</i> —a .....	446 ha (1,103 ac) .....	40 ha (95 ac) .....	.....	486 ha (1,198 ac)
Maui 17— <i>Hedyotis coriacea</i> —a .....	106 ha (262 ac) .....	<1 ha (<1 ac) .....	.....	106 ha (262 ac)
Maui 17— <i>Hedyotis coriacea</i> —b .....	138 ha (340 ac) .....	.....	.....	138 ha (340 ac)
Maui 17— <i>Hedyotis mannii</i> —a .....	572 ha (1,414 ac) .....	1,662 ha (4,107 ac) .....	.....	2,234 ha (5,521 ac)
Maui 17— <i>Hesperomannia arbuscula</i> —a.	378 ha (933 ac) .....	14 ha (35 ac) .....	.....	392 ha (968 ac)
Maui 17— <i>Hesperomannia arbuscula</i> —b.	.....	436 ha (1,076 ac) .....	.....	436 ha (1,076 ac)
Maui 17— <i>Hibiscus brackenridgei</i> —b	593 ha (1,463 ac) .....	74 ha (182 ac) .....	.....	667 ha (1,645 ac)
Maui 17— <i>Isodendron pyriforme</i> —a	224 ha (555 ac) .....	<1 ha (<1 ac) .....	.....	224 ha (555 ac)
Maui 17— <i>Lysimachia lydgatei</i> —a .....	64 ha (157 ac) .....	26 ha (64 ac) .....	.....	90 ha (221 ac)
Maui 17— <i>Lysimachia lydgatei</i> —b .....	42 ha (104 ac) .....	116 ha (287 ac) .....	.....	158 ha (391 ac)
Maui 17— <i>Lysimachia lydgatei</i> —c .....	19 ha (46 ac) .....	28 ha (70 ac) .....	.....	47 ha (116 ac)
Maui 17— <i>Lysimachia lydgatei</i> —d .....	28 ha (70 ac) .....	70 ha (172 ac) .....	.....	98 ha (242 ac)
Maui 17— <i>Lysimachia lydgatei</i> —e .....	18 ha (44 ac) .....	.....	.....	18 ha (44 ac)
Maui 17— <i>Neraudia sericea</i> —b .....	1,026 (2,538 ac) .....	ha 162 ha (400 ac) .....	.....	1,188 ha (2,938 ac)
Maui 17— <i>Peucedanum sandwicense</i> —b.	.....	117 ha (289 ac) .....	.....	117 ha (289 ac)
Maui 17— <i>Phlegmariurus mannii</i> —d ..	57 ha (141 ac) .....	<1 ha (<1 ac) .....	.....	57 ha (141 ac)
Maui 17— <i>Phlegmariurus mannii</i> —e ..	29 ha (72 ac) .....	6 ha (15 ac) .....	.....	35 ha (87 ac)
Maui 17— <i>Plantago princeps</i> —b .....	23 ha (57 ac) .....	304 ha (750 ac) .....	.....	327 ha (807 ac)

TABLE 4.—APPROXIMATE CRITICAL HABITAT DESIGNATED AREA BY UNIT AND LAND OWNERSHIP OR JURISDICTION, MAUI COUNTY, HAWAII—Continued

Unit name	State/local	Private	Federal	Total
Maui 17— <i>Platanthera holochila</i> —b ...	4 ha (10 ac) .....	4 ha (9 ac) .....	.....	8 ha (19 ac)
Maui 17— <i>Platanthera holochila</i> —c ...	189 ha (466 ac) .....	<1 ha (<1 ac) .....	.....	189 ha (466 ac)
Maui 17— <i>Pteris lidgatei</i> —a .....	504 ha (1,246 ac) .....	664 ha (1,641 ac) .....	.....	1,168 ha (2,887 ac)
Maui 17— <i>Pteris lidgatei</i> —b .....	.....	163 ha (403 ac) .....	.....	163 ha (403 ac)
Maui 17— <i>Remya mauiensis</i> —a .....	227 ha (562 ac) .....	1 ha (2 ac) .....	.....	228 ha (564 ac)
Maui 17— <i>Remya mauiensis</i> —b .....	366 ha (904 ac) .....	201 ha (496 ac) .....	.....	567 ha (1,400 ac)
Maui 17— <i>Remya mauiensis</i> —c .....	31 ha (78 ac) .....	<1 ha (<1 ac) .....	.....	31 ha (78 ac)
Maui 17— <i>Sanicula purpurea</i> —a .....	29 ha (70 ac) .....	5 ha (13 ac) .....	.....	34 ha (83 ac)
Maui 17— <i>Sanicula purpurea</i> —b .....	97 ha (240 ac) .....	209 ha (516 ac) .....	.....	306 ha (756 ac)
Maui 17— <i>Sanicula purpurea</i> —c .....	.....	8 ha (19 ac) .....	.....	8 ha (19 ac)
Maui 17— <i>Spermolepis hawaiiensis</i> —b.	23 ha (56 ac) .....	.....	.....	23 ha (56 ac)
Maui 17— <i>Tetramolopium capillare</i> —a.	1,106 ha (2,732 ac) .....	676 ha (1,672 ac) .....	.....	1,782 ha (4,404 ac)
Maui 17— <i>Tetramolopium remyi</i> —a ...	216 ha (536 ac) .....	71 ha (176 ac) .....	.....	287 ha (712 ac)
Maui 18— <i>Alectryon macrococcus</i> —f	5 ha (11 ac) .....	3 ha (6 ac) .....	.....	8 ha (17 ac)
Maui 18— <i>Colubrina oppositifolia</i> —c	38 ha (92 ac) .....	26 ha (63 ac) .....	.....	64 ha (155 ac)
Maui 18— <i>Ctenitis squamigera</i> —d .....	10 ha (24 ac) .....	4 ha (10 ac) .....	.....	14 ha (34 ac)
Maui 18— <i>Remya mauiensis</i> —d .....	1 ha (3 ac) .....	1 ha (3 ac) .....	.....	2 ha (6 ac)
Kahoolawe 1— <i>Kanaloa kahoolawensis</i> —a.	562 ha (1,388 ac) .....	.....	.....	562 ha (1,388 ac)
Kahoolawe 2— <i>Kanaloa kahoolawensis</i> —b.	613 ha (1,515 ac) .....	.....	.....	613 ha (1,515 ac)
Kahoolawe 3— <i>Kanaloa kahoolawensis</i> —c.	5 ha (12 ac) .....	.....	.....	5 ha (12 ac)
Total* .....	21,229 ha (52,458 ac) .....	8,858 ha (21,890 ac) .....	8,805 ha (21,757 ac) .....	38,897 ha (96,115 ac)

\* Totals take into consideration overlapping individual species units.

TABLE 5.—APPROXIMATE FINAL CRITICAL HABITAT AREA (HA (AC)), ESSENTIAL AREA, AND EXCLUDED AREA ON MAUI AND KAHOO LAWE

Area considered essential on Maui .....	48,352 ha (119,480 ac)
Area not included because of special management or protection (State upper Hanawi NAR, ML&P Puu Kukui WMA, and TNCH Kupunukea and Waikamoi Preserves) on Maui.	6,741 ha (16,657 ac)
Area excluded under 4(b)(2) (Haleakala and Ulupalakua Ranches) on Maui .....	3,894 ha (9,622 ac)
Final Critical Habitat on Maui .....	37,717 ha (93,200 ac)
Final Critical Habitat on Kahoolawe .....	1,180 ha (2,915 ac)
Total Critical Habitat on Maui and Kahoolawe .....	38,897 ha (96,115)

Critical habitat includes habitat for 59 species primarily in the upland portions of Maui, and for one species on Kahoolawe. Lands designated as critical habitat have been divided into a total of 139 units. A brief description of each unit is presented below.

#### Descriptions of Critical Habitat Units

##### Maui 9—*Alectryon macrococcus*—a

This unit is critical habitat for *Alectryon macrococcus* and is 1,893 ha (4,678 ac) on State and privately owned lands. The unit contains Auwahi and Manawainui gulches including portions of Lualailua Hills, Puu Kao, and Kamole and Kepuni gulches. It, in combination with Maui 10—*Alectryon macrococcus*—b, Maui 13—*Alectryon macrococcus*—c, and land on Ulupalakua and Haleakala ranches, provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus*

and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

##### Maui 10—*Alectryon macrococcus*—b

This unit is critical habitat for *Alectryon macrococcus* and is 402 ha (993 ac) on State (Kahikinui Forest Reserve) and privately owned land. The unit contains land from Pahihi Gulch to Kahalulu Gulch. It, in combination with Maui 9—*Alectryon macrococcus*—a, Maui 13—*Alectryon macrococcus*—c,

and Haleakala and Ulupalakua ranches, provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

##### Maui 13—*Alectryon macrococcus*—c

This unit is critical habitat for *Alectryon macrococcus* and is 419 ha (1,033 ac) on State-owned land (Kanaio NAR). The unit contains the area below

Puu Ouli. It, in combination with Ulupalakua and Haleakala ranches, and Maui 9—*Alectryon macrococcus*—a and Maui 10—*Alectryon macrococcus*—b, provides habitat for 2 populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Alectryon macrococcus*—d

This unit is critical habitat for *Alectryon macrococcus* and is 390 ha (965 ac) on State (West Maui Forest Reserve and the Panaewa Section of West Maui NAR) and privately owned land. The unit contains portions of Wahikuli and Kealii gulches and Puuiki, Kahoma, and Kanaha streams. It, in combination with Maui 17—*Alectryon macrococcus*—e, Maui 18—*Alectryon macrococcus*—f, and Kapunakea Preserve, provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Alectryon macrococcus*—e

This unit is critical habitat for *Alectryon macrococcus* and is 110 ha (271 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Honokowai Stream. It, in combination with Maui 17—*Alectryon macrococcus*—d, Maui 18—*Alectryon macrococcus*—f and Kapunakea Preserve, provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus* and is currently occupied by three plants. The habitat

features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 18—*Alectryon macrococcus*—f

This unit is critical habitat for *Alectryon macrococcus* and is 8 ha (17 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Honokawai Valley. It, in combination with Maui 17—*Alectryon macrococcus*—d, Maui 17—*Alectryon macrococcus*—e, and Kapunakea Preserve, provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *A. macrococcus* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wetter mesic and upper dryland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a

This unit is critical habitat for *Argyroxiphium sandwicense* ssp. *macrocephalum* and is 8,965 ha (22,153 ac) on State (Kula and Kahikinui Forest Reserve), Federal (Haleakala National Park), and privately owned land. The unit contains portions of Halalii Summit, Haleakala Summit, Haleakala Crater, Hanakauhi Summit, Haupaakea Peak Summit, Hina Summit, Honokahua Summit, Ka Moa o Pele Summit, Kalahaku Pali, Kalepeamo Summit, Kalua Awa Summit, Kaluaiki Crater, Kaluanui Crater, Kaluu o ka Oo Crater, Kamaolii Summit, Kanahau Summit, Keoneheehee Ridge, Kilohana Summit, Kolekole Summit, Koolau Gap, and Kumuilahi. It provides habitat for one population of greater than 50,000 mature, reproducing individuals of the long-lived perennial *A. sandwicense* ssp. *macrocephalum* and is currently

occupied by 39,000 to 44,000 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, lava flows with almost no soil development and otherwise barren, unstable slopes of recent (less than several thousand years old) volcanic cinder cones subject to frequent formation of ice at night and extreme heating during cloudless days with an annual precipitation of approximately 75 to 250 cm (29.6 to 98.4 in). This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not feel that there is enough habitat designated to reach the recovery goal of 8 to 10 populations, this species is a very narrow endemic in terms of its alpine habitat requirement, and probably never naturally occurred in more than a single or a few populations.

Maui 9—*Asplenium fragile* var. *insulare*—a

This unit is critical habitat for *Asplenium fragile* var. *insulare* and is 362 ha (894 ac) on federally owned land (Haleakala National Park). The unit contains Koolau Gap. This unit, in combination with Waikamoi Preserve, provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *A. fragile* var. *insulare* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, streamside hollows and grottos in gulches. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Bidens micrantha* ssp. *kalealaha*—a

This unit is critical habitat for *Bidens micrantha* ssp. *kalealaha* and is 1,562 ha (3,862 ac) on State (Kahikinui Forest Reserve), Federal, and privately owned land. The unit contains portions of Kumuilahi and Haleakala summits, Pukai, Pahihi, and Waioale gulches, Haleakala Crater, and Kumuilahi. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *B. micrantha* ssp. *kalealaha* and is currently occupied by two plants. The habitat features

contained in this unit that are essential for this species include, but are not limited to, blocky lava flows with little or no soil development, deep pit craters, and sheer rock walls in open canopy montane shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Bidens micrantha* ssp. *kalealaha*—b

This unit is critical habitat for *Bidens micrantha* ssp. *kalealaha* and is 2,115 ha (5,229 ac) on State-owned land (Kahikinui Forest Reserve). The unit is between Kanaio and Auwahi. It provides habitat for 4 populations of 300 mature, reproducing individuals of the short-lived perennial *B. micrantha* ssp. *kalealaha* and is currently occupied by 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, blocky lava flows with little or no soil development, deep pit craters, and sheer rock walls in open canopy montane shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 13—*Bonamia menziesii*—a

This unit is critical habitat for *Bonamia menziesii* and is 536 ha (1,325 ac) on State (Kanaio NAR) land. The unit lies in the area between Kanaio and Auwahi. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *B. menziesii* and is currently occupied by 5 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, aa lava in mixed open dry forest; *Erythrina sandwicensis* lowland dry forest, or mesic mixed *Metrosideros polymorpha* forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance

away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 2—*Brighamia rockii*—a

This unit is critical habitat for *Brighamia rockii* and is 5 ha (14 ac) on State and privately owned land. The unit lies near Lahoole Cape. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *B. rockii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep sea cliffs, often within the spray zone. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 2—*Brighamia rockii*—b

This unit is critical habitat for *Brighamia rockii* and is 17 ha (42 ac) on State and privately owned land. The unit contains Kaemi, Lahoole, and Moho capes, Makalina Valley, Waiokila and Waiolai gulches, Makamakaole Stream, and Puu Makawana Summit. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *B. rockii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep sea cliffs, often within the spray zone. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 3—*Brighamia rockii*—c

This unit is critical habitat for *Brighamia rockii* and is 3 ha (9 ac) on State and privately owned land. The unit contains Waikamoi Stream, Waihaneppee Stream, and Puohokamoa Stream. This unit in combination with Maui 4—*Brighamia rockii*—d and Maui 5—*Brighamia rockii*—e, provides habitat for one population of 100

mature, reproducing individuals of the long-lived perennial *B. rockii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep sea cliffs, often within the spray zone. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 4—*Brighamia rockii*—d

This unit is critical habitat for *Brighamia rockii* and is 1 ha (2 ac) on State-owned land. The unit contains all of Keopuka Rock. This unit provides habitat for one population in combination with Maui 3—*Brighamia rockii*—c and Maui 5—*Brighamia rockii*—e, of 100 mature, reproducing individuals of the long-lived perennial *B. rockii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep sea cliffs, often within the spray zone. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 5—*Brighamia rockii*—e

This unit is critical habitat for *Brighamia rockii* and is 7 ha (16 ac) on State-owned land. The unit contains Moiki Point and Haipuaena Stream. This unit provides habitat for one population in combination with Maui 3—*Brighamia rockii*—c and Maui 4—*Brighamia rockii*—d, of 100 mature, reproducing individuals of the long-lived perennial *B. rockii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock crevices on steep sea cliffs, often within the spray zone. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the

island from being destroyed by one naturally occurring catastrophic event.

Maui 13—*Cenchrus agrimonioides*—a

This unit is critical habitat for *Cenchrus agrimonioides* and is 237 ha (585 ac) on State (Kanaio NAR) land. The unit contains land between Kanaio and Auwahi. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. agrimonioides* and is currently occupied by between one and 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry forest or *Pleomele* sp.-*Diospyros* sp. forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cenchrus agrimonioides*—b

This unit is critical habitat for *Cenchrus agrimonioides* and is 118 ha (293 ac) on State (West Maui Forest Reserve and Manawainui Plant Sanctuary) and privately owned land. The unit contains Papalaua and Manawainui gulches and Hanaulaiki. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. agrimonioides* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry forest or *Pleomele* sp.-*Diospyros* sp. forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 1—*Centaurium sebaeoides*—a

This unit is critical habitat for *Centaurium sebaeoides* and is 70 ha (174 ac) on non-managed State and privately owned land. The unit contains Alapapa Gulch, Honanana Gulch, Mokolea Point, Owaluhi Gulch, Papanahoa Gulch, Papanalahoa Point, Poelua Bay, and Poelua Gulch. It provides habitat for one population of 300 mature, reproducing individuals of

the short-lived perennial *C. sebaeoides* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry forest or *Pleomele* sp.-*Diospyros* sp. forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 2—*Centaurium sebaeoides*—b

This unit is critical habitat for *Centaurium sebaeoides* and is 26 ha (65 ac) on State and privately owned land. The unit contains Alapapa Gulch, Honanana Gulch, Lahoole Cape, Makamakaole Stream, Moho Cape, Mokolea Point, Owaluhi Gulch, Papanahoa Gulch, Papanalahoa Point, Poelua Bay, Poelua Gulch, Waihee Stream, Waihee Valley, Waiokila Gulch, and Waiolai Gulch. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. sebaeoides* and is currently occupied by 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry forest or *Pleomele* sp.-*Diospyros* sp. forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Clermontia lindseyana*—a

This unit is critical habitat for *Clermontia lindseyana* and is 177 ha (438 ac) on State-owned land. The unit contains Manawainui Gulch. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. lindseyana* and is currently occupied by 330 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Acacia koa* mesic forest. This unit is essential to the conservation of the species because it supports an extant colony of this species. It is some distance away from the other critical habitat for this

species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Clermontia lindseyana*—b

This unit is critical habitat for *Clermontia lindseyana* and is 60 ha (149 ac) on State-owned land (Kula Forest Reserve). The unit contains no named natural features. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. lindseyana* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Acacia koa* mesic forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Clermontia oblongifolia* ssp. *mauiensis*—a

This unit is critical habitat for *Clermontia oblongifolia* ssp. *mauiensis* and is 16 ha (40 ac) on State and privately owned land. The unit contains no named natural features. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. oblongifolia* ssp. *mauiensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of ridges and ridge tops in *Metrosideros polymorpha*-dominated montane forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Clermontia oblongifolia* ssp. *mauiensis*—b

This unit is critical habitat for *Clermontia oblongifolia* ssp. *mauiensis* and is 696 ha (1,720 ac) on State (Kahakuloa Section of the West Maui NAR) and privately owned land. The unit contains Eke Crater, Konanano Gulch, and Kahakuloa Valley. This unit provides habitat for 4 populations of 300 mature, reproducing individuals of

the short-lived perennial *C. oblongifolia* ssp. *mauiensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of ridges and ridge tops in *Metrosideros polymorpha*-dominated montane forest. This unit is essential to conservation of the species because it provides for four populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Clermontia oblongifolia* ssp. *mauiensis*—c

This unit is critical habitat for *Clermontia oblongifolia* ssp. *mauiensis* and is 295 ha (732 ac) on State (Honokowai Section of the West Maui NAR) and privately owned land. The unit contains Violet Lake, Amalu and Kapaloa streams, and Honokowai Valley. This unit provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. oblongifolia* ssp. *mauiensis* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of ridges and ridge tops in *Metrosideros polymorpha*-dominated montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Clermontia samuelii*—a

This unit is critical habitat for *Clermontia samuelii* and is 3,130 ha (7,735 ac) on State (Hana and Koolau Forest Reserve) and federally (Haleakala National Park) owned land. The unit contains Anapanapa Lake, Heleleikeoha Stream, Kawakoe Valley, and Kawaipapa Stream. This unit provides habitat for 5 populations of 300 mature, reproducing individuals of the short-lived perennial *C. samuelii* and is currently occupied by 5 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet *Metrosideros polymorpha* and *M. polymorpha-Dicranopteris linearis*

forest or wet *M. polymorpha* and *M. polymorpha-Cheirodendron trigynum* forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is of an appropriate size so that each potential population important for the conservation of the species within the unit is geographically separated enough to avoid their destruction by one naturally occurring catastrophic event.

Maui 13—*Colubrina oppositifolia*—a

This unit is critical habitat for *Colubrina oppositifolia* and is 739 ha (1,827 ac) on State (Kanaio NAR) land. The unit contains land between Kanaio and Auwahi. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *C. oppositifolia* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, lowland dry and mesic forests dominated by *Diospyros sandwicensis*. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Colubrina oppositifolia*—b

This unit is critical habitat for *Colubrina oppositifolia* and is 176 ha (435 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains Kahoma and Kanaha Valleys and Halona Stream. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *C. oppositifolia* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, lowland dry and mesic forests dominated by *Diospyros sandwicensis*. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the

species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 18—*Colubrina oppositifolia*—c

This unit is critical habitat for *Colubrina oppositifolia* and is 64 ha (155 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Honokowai Valley. This unit provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *C. oppositifolia* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, lowland dry and mesic forests dominated by *Diospyros sandwicensis*. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Ctenitis squamigera*—a

This unit is critical habitat for *Ctenitis squamigera* and is 1,979 ha (4,890 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Hokuula and Puu Lio summits, Nakalaloa and Poohahoahoa streams, and Kapilau Ridge. This unit provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. squamigera* and is currently occupied by 30 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, forest understory in *Metrosideros polymorpha* montane wet forest, mesic forest, or diverse mesic forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Ctenitis squamigera*—b

This unit is critical habitat for *Ctenitis squamigera* and is 816 ha (2,018 ac) on State (Panaewa Section of the West Maui NAR and West Maui Forest Reserve) and privately owned land. The unit contains Wahikuli, Hahakea and



Puuiki gulches, and Kanaha Stream. This unit provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. squamigera* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, forest understory in *Metrosideros polymorpha* montane wet forest, mesic forest, or diverse mesic forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Ctenitis squamigera*—c

This unit is critical habitat for *Ctenitis squamigera* and is 137 ha (337 ac) on State (Honokowai Section of the West Maui NAR and West Maui Forest Reserve) and privately owned land. The unit contains Kapaloa and Amalu Streams. This unit provides habitat for one population, in combination with Maui 18—*Ctenitis squamigera*—d and Kapunakea Preserve, of 300 mature, reproducing individuals of the short-lived perennial *C. squamigera* and is currently occupied by 21 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, forest understory in *Metrosideros polymorpha* montane wet forest, mesic forest, or diverse mesic forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 18—*Ctenitis squamigera*—d

This unit is critical habitat for *Ctenitis squamigera* and is 14 ha (34 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains no named natural features and provides habitat for one population in combination with Maui 17—*Ctenitis squamigera*—c and Kapunakea Preserve of 300 mature, reproducing individuals of the short-lived perennial *C. squamigera* and is currently unoccupied. The habitat features

contained in this unit that are essential for this species include, but are not limited to, forest understory in *Metrosideros polymorpha* montane wet forest, mesic forest, or diverse mesic forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Cyanea copelandii* ssp. *haleakalaensis*—a

This unit is critical habitat for *Cyanea copelandii* ssp. *haleakalaensis* and is 501 ha (1,238 ac) on State and privately owned land. The unit contains Opana Gulch, Kailua Stream, and Haiku Uka. This unit provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *C. copelandii* ssp. *haleakalaensis* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, stream banks and wet talus slopes. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Cyanea copelandii* ssp. *haleakalaensis*—b

This unit is critical habitat for *Cyanea copelandii* ssp. *haleakalaensis* and is 1,709 ha (4,224 ac) on State (Hana Forest Reserve) and federally (Haleakala National Park) owned land. The unit contains Kaumakani Summit, Puu Kue Summit, Kipahulu Valley, Kaukai Gulch, and Palikea Stream. It provides habitat for 5 populations of 300 mature, reproducing individuals of the short-lived perennial *C. copelandii* ssp. *haleakalaensis* and is currently occupied by 200 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, stream banks and wet talus slopes. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away

from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Cyanea glabra*—a

This unit is critical habitat for *Cyanea glabra* and is 450 ha (1,112 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Wiohiwi Gulch. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Cyanea glabra*—b

This unit is critical habitat for *Cyanea glabra* and is 649 ha (1,605 ac) on federally owned land (Haleakala National Park). The unit contains Kipahulu Valley, Palikea Stream, and Kaukai Gulch. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Cyanea glabra*—c

This unit is critical habitat for *Cyanea glabra* and is 363 ha (897 ac) on State (Hana Forest Reserve) land. The unit contains Waihoi Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream

banks in wet lowland forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea glabra*—d

This unit is critical habitat for *Cyanea glabra* and is 255 ha (630 ac) on State (West Maui Forest Reserve) land. The unit contains Olowalu Valley and Stream. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea glabra*—e

This unit is critical habitat for *Cyanea glabra* and is 471 ha (1,163 ac) on State (Panaewa Section of the West Maui NAR, and West Maui Forest Reserve) and privately owned land. The unit contains Waihikuli, Hahakea and Puuiki gulches, and Kanaha and Halona streams. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea glabra*—f

This unit is critical habitat for *Cyanea glabra* and is 188 ha (464 ac) on State (Honokowai Section of the West Maui NAR, and West Maui Forest Reserve) and privately owned land. The unit

contains Amalu and Kapaloa streams. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea glabra*—g

This unit is critical habitat for *Cyanea glabra* and is 79 ha (194 ac) on privately owned land. The unit contains Kauaula Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *C. glabra* and is currently occupied by 12 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, soil and rock stream banks in wet lowland forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea grimesiana* ssp. *grimesiana*—a

This unit is critical habitat for *Cyanea grimesiana* ssp. *grimesiana* and is 921 ha (2,273 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains the Needle Summit, Poohahouhoa Stream, Nakalaloa Stream, and Iao Valley. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. grimesiana* ssp. *grimesiana* and is currently occupied by fewer than 5 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, rocky or steep slopes of stream banks in wet forest gulch bottoms. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away

from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Cyanea hamatiflora* ssp. *hamatiflora*—a

This unit is critical habitat for *Cyanea hamatiflora* ssp. *hamatiflora* and is 611 ha (1,509 ac) on State (Koolau Forest Reserve) and privately owned land. The unit contains Haipuaena Stream, Puohokamoa Stream, and Waikamoi Stream. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *C. hamatiflora* ssp. *hamatiflora* and is currently occupied by 5 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, montane wet forest dominated by *Metrosideros polymorpha* with a *Cibotium* sp. and/or native shrub understorey or closed *Acacia koa*-*M. polymorpha* wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Cyanea hamatiflora* ssp. *hamatiflora*—b

This unit is critical habitat for *Cyanea hamatiflora* ssp. *hamatiflora* and is 1,310 ha (3,235 ac) on State (Kipahulu and Hana Forest Reserve) and federally owned (Haleakala National Park) land. The unit contains Puu Ahulili Summit, Kipahulu Valley, Kaumakani Summit, Kaukai Gulch, and Palikea Stream. It provides habitat for 5 populations of 300 mature, reproducing individuals of the short-lived perennial *C. hamatiflora* ssp. *hamatiflora* and is currently occupied by 13 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, montane wet forest dominated by *Metrosideros polymorpha* with a *Cibotium* sp. and/or native shrub understorey or closed *Acacia koa*-*M. polymorpha* wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for

the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea lobata*—a

This unit is critical habitat for *Cyanea lobata* and is 132 ha (323 ac) on State (Honokowai Section of the West Maui NAR, and West Maui Forest Reserve) and privately owned land. The unit contains Kapaloa and Amalu Streams. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. lobata* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep stream banks in deep shade in wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea lobata*—b

This unit is critical habitat for *Cyanea lobata* and is 114 ha (281 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains Kauaula Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. lobata* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep stream banks in deep shade in wet forest. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyanea lobata*—c

This unit is critical habitat for *Cyanea lobata* and is 578 ha (1,427 ac) on State (Kahakuloa Section of the West Maui NAR) and privately owned land. The unit contains Honanana and Kahakuloa Streams. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *C. lobata* and is currently unoccupied. The habitat features contained in this unit that are essential for this species

include, but are not limited to, steep stream banks in deep shade in wet forest. This unit is essential to the conservation of the species because it provides for three populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Cyanea mceldowneyi*—a

This unit is critical habitat for *Cyanea mceldowneyi* and is 2,127 ha (5,255 ac) on State (Makawao and Koolau Forest Reserves) and privately owned land. The unit contains area from Kahakapau Gulch to the rim of Keanae Valley. It provides habitat for 5 populations of 300 mature, reproducing individuals of the short-lived perennial *C. mceldowneyi* and is currently occupied by 33 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, montane wet and mesic forest with mixed *Metrosideros polymorpha*-*Acacia koa*. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not feel that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is of an appropriate size so that each potential population important for the conservation of the species within the unit is geographically separated enough to avoid their destruction by one naturally occurring catastrophic event.

Maui 17—*Cyrtandra munroi*—a

This unit is critical habitat for *Cyrtandra munroi* and is 156 ha (386 ac) on State (Honokowai Section of the West Maui NAR, and West Maui Forest Reserve) and privately owned land. The unit contains Amalu Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. munroi* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, moist to wet, moderately steep talus slopes. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid

all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyrtandra munroi*—b

This unit is critical habitat for *Cyrtandra munroi* and is 238 ha (590 ac) on State and privately owned land. The unit contains Hahakea and Puuiki gulches and Kahoma Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *C. munroi* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, moist to wet, moderately steep talus slopes. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Cyrtandra munroi*—c

This unit is critical habitat for *Cyrtandra munroi* and is 603 ha (1,490 ac) on State (Kahakuloa Section of the West Maui NAR) and privately owned land. The unit contains Kahakuloa Valley, Honanana Gulch, Keahikauo, and Makamakaole Stream. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *C. munroi* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, moist to wet, moderately steep talus slopes. This unit is essential to the conservation of the species because it provides for three populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Diellia erecta*—a

This unit is critical habitat for *Diellia erecta* and is 2 ha (6 ac) on State-owned land (Kula Forest Reserve). The unit contains no named natural features. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are

not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 9—*Diellia erecta*—b

This unit is critical habitat for *Diellia erecta* and is 174 ha (432 ac) on State-owned land. The unit contains Puu Pane. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 17—*Diellia erecta*—c

This unit is critical habitat for *Diellia erecta* and is 22 ha (55 ac) on State (West Maui Forest Reserve) land. The unit contains Papalaua Gulch. It provides habitat for one population; in combination with Maui 17—*Diellia erecta*—e and Maui 17—*Diellia erecta*—f, of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 17—*Diellia erecta*—d

This unit is critical habitat for *Diellia erecta* and is 70 ha (172 ac) on privately owned land. The unit contains Iao Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently occupied by 20 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 17—*Diellia erecta*—e

This unit is critical habitat for *Diellia erecta* and is 12 ha (30 ac) on State (Manawainui Plant Sanctuary) land. The unit contains no named natural features. It provides habitat for one population, in combination with Maui 17—*Diellia erecta*—c and Maui 17—*Diellia erecta*—f, of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 17—*Diellia erecta*—f

This unit is critical habitat for *Diellia erecta* and is 14 ha (34 ac) on State-owned land (West Maui Forest Reserve). The unit contains Hanaulaiki. It provides habitat for one population in combination with Maui 17—*Diellia erecta*—c and Maui 17—*Diellia erecta*—e, of 300 mature, reproducing individuals of the short-lived perennial *D. erecta* and is currently occupied by one plant. The habitat features contained in this unit that are essential

for this species include, but are not limited to, granular soil with leaf litter and moss on north-facing slopes in deep shade or gulch bottoms. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 8—*Diplazium molokaiense*—a

This unit is critical habitat for *Diplazium molokaiense* and is 575 ha (1,420 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Puu o Kakae, Waikamoi, Honomanu, and Piinaau streams. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *D. molokaiense* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, land near water courses, often in proximity to waterfalls, in lowland or montane mesic forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

#### Maui 9—*Diplazium molokaiense*—b

This unit is critical habitat for *Diplazium molokaiense* and is 162 ha (401 ac) on State-owned land. The unit contains Manawainui Stream. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *D. molokaiense* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, land near water courses, often in proximity to waterfalls, in lowland or montane mesic forests. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the

island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Diplazium molokaiense*—c

This unit is critical habitat for *Diplazium molokaiense* and is 1,495 ha (3,693 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains the Needle Summit, Poohahouhoa and Nakalaloa streams, and Iao Valley). It provides habitat for three populations of 300 mature, reproducing individuals of the short-lived perennial *D. molokaiense* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, land near water courses, often in proximity to waterfalls, in lowland or montane mesic forests. This unit is essential to the conservation of the species because it provides for three populations within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Dubautia plantaginea* ssp. *humilis*—a

This unit is critical habitat for *Dubautia plantaginea* ssp. *humilis* and is 293 ha (723 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Kauaula Valley and Stream and Niupoko. It provides habitat for three populations of 300 mature, reproducing individuals of the short-lived perennial *D. plantaginea* ssp. *humilis* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Maui in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet, barren, steep, rocky, wind-blown cliffs. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species this unit is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Dubautia plantaginea* ssp. *humilis*—b

This unit is critical habitat for *Dubautia plantaginea* ssp. *humilis* and is 114 ha (283 ac) on State (West Maui

Forest Reserve) and privately owned land. The unit contains Lihau Summit and Olowalu Valley. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *D. plantaginea* ssp. *humilis* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Maui in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet, barren, steep, rocky, wind-blown cliffs. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is some distance away from the other critical habitat for this species in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Dubautia plantaginea* ssp. *humilis*—c

This unit is critical habitat for *Dubautia plantaginea* ssp. *humilis* and is 95 ha (234 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Iao Valley and Needle and Au Stream. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *D. plantaginea* ssp. *humilis* and is currently occupied by 65 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet, barren, steep, rocky, wind-blown cliffs. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit some distance away from the other critical habitat for this species in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Flueggea neowawraea*—a

This unit is critical habitat for *Flueggea neowawraea* and is 52 ha (128 ac) on State-owned land (Department of Hawaiian Home Lands (DHHL)). The unit contains Lualailua Hills. It provides habitat for one population in combination with Ulupalakua Ranch of 100 mature, reproducing individuals of

the long-lived perennial *F. neowawraea* and is currently occupied by 4 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry or mesic forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 13—*Flueggea neowawraea*—b

This unit is critical habitat for *Flueggea neowawraea* and is 50 ha (124 ac) on State-owned land. The unit contains land west of Auwahi Gulch and south of Puu Ouli. In combination with Ulupalakua Ranch and Maui 9—*Flueggea neowawraea*—a, it provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *F. neowawraea* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry or mesic forest. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Geranium arboreum*—a

This unit is critical habitat for *Geranium arboreum* and is 731 ha (1,806 ac) on State (Kula Forest Reserve) land. The unit contains Polipoli Summit. It provides habitat for 4 populations of 100 mature, reproducing individuals of the long-lived perennial *G. arboreum* and is currently occupied by 12 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, damp, and shaded narrow canyons and gulches, steep banks, and intermittent streams. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not feel that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are of an appropriate

distance apart to avoid their destruction by one naturally occurring catastrophic event.

Maui 14—*Geranium arboreum*—b

This unit is critical habitat for *Geranium arboreum* and is 452 ha (1,115 ac) on State (Kula Forest Reserve) and privately owned land. The unit contains Waiohuli Gulch. It provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *G. arboreum* and is currently occupied by 22 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, damp, and shaded narrow canyons and gulches, steep banks, and intermittent streams. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 15—*Geranium arboreum*—c

This unit is critical habitat for *Geranium arboreum* and is 667 ha (1,648 ac) on State (Kula Forest Reserve) and privately owned land. The unit contains land from Waiakoa to Kamehamehenui. It provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *G. arboreum* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, damp, and shaded narrow canyons and gulches, steep banks, and intermittent streams. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not feel that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are of an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

Maui 8—*Geranium multiflorum*—a

This unit is critical habitat for *Geranium multiflorum* and is 46 ha (113 ac) on privately owned land. The unit contains Honomanu and Pihaau streams. It provides habitat for one population in combination with

Waikamoi Preserve of 100 mature, reproducing individuals of the long-lived perennial *G. multiflorum* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet or mesic *Metrosideros polymorpha* montane forest or alpine mesic forest, *Leptecophylla tameiameiae* shrubland, *Sophora chrysophylla* subalpine dry forest, open sedge swamps, fog-swept lava flows, or montane grasslands. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Geranium multiflorum*—b

This unit is critical habitat for *Geranium multiflorum* and is 4,817 ha (11,902 ac) on State (Koolau Forest Reserve), Federal (Haleakala National Park), and privately owned land. The unit contains Anapanapa Lake, Halalii Summit, Haleakala Crater, Hanakauhi Summit, Hina, Mauna Summit, Honokahua Summit, Ka Moa o Pele Summit, Kalapawili Ridge, Kalua Awa Summit, Kaluaiki Crater, Kaluanui Crater, Koolau Gap, Kuiki Summit, Laie Cave, Laie Puu Summit, Lauulu Summit, Namana o ke Akua Summit, Oili Puu Summit, Pohaku Palaha Summit, Puu Alaea Summit, Puu Kauaua Summit, Puu Kumu Summit, Puu Maile Summit, Puu Mamane Summit, Puu Naue Summit, Puu Nole Summit, and Waikekeehia. It provides habitat for 6 populations of 100 mature, reproducing individuals of the long-lived perennial *G. multiflorum* and is currently occupied by 122 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet or mesic *Metrosideros polymorpha* montane forest or alpine mesic forest, *Leptecophylla tameiameiae* shrubland, *Sophora chrysophylla* subalpine dry forest, open sedge swamps, fog-swept lava flows, or montane grasslands. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the establishment of additional populations. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Geranium multiflorum*—c

This unit is critical habitat for *Geranium multiflorum* and is 183 ha (450 ac) on State-owned land. The unit contains Manawainui Gulch. It provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *G. multiflorum* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, wet or mesic *Metrosideros polymorpha* montane forest or alpine mesic forest, *Leptecophylla tameiameiae* shrubland, *Sophora chrysophylla* subalpine dry forest, open sedge swamps, fog-swept lava flows, or montane grasslands. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Gouania vitifolia*—a

This unit is critical habitat for *Gouania vitifolia* and is 486 ha (1,198 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains Paupau Summit and Halona and Kanaka streams. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *G. vitifolia* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, the sides of ridges and gulches in dry to mesic forests. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hedyotis coriacea*—a

This unit is critical habitat for *Hedyotis coriacea* and is 106 ha (262 ac) on State (Lihau Section of the West Maui NAR) and privately owned land. The unit contains Olowalu Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *H. coriacea* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep,

rocky slopes in dry lowland *Dodonaea viscosa*-dominated shrublands. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hedyotis coriacea*—b

This unit is critical habitat for *Hedyotis coriacea* and is 138 ha (340 ac) on State-owned land (West Maui Forest Reserve). The unit contains Ukumehame Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *H. coriacea* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, rocky slopes in dry lowland *Dodonaea viscosa*-dominated shrublands. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hedyotis mannii*—a

This unit is critical habitat for *Hedyotis mannii* and is 2,234 ha (5,521 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains the Needle Summit, Poohahouhoa Stream, Nakalaloa Stream, Iao Valley, Kauaula, Makila Stream, and Kanaha Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *H. mannii* and is currently occupied by fewer than 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, basalt cliffs along stream banks in *Metrosideros polymorpha*-*Dicranopteris linearis* montane wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the

island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hesperomannia arbuscula*—a

This unit is critical habitat for *Hesperomannia arbuscula* and is 392 ha (968 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains Panaewa Valley and Halona and Kanaha streams. It provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *H. arbuscula* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep forested slopes and ridges in mesic forest dominated by *Metrosideros polymorpha* or *Diospyros sandwicensis*. This is essential to the conservation of the species because it unit provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hesperomannia arbuscula*—b

This unit is critical habitat for *Hesperomannia arbuscula* and is 436 ha (1,076 ac) on privately owned land. The unit contains Iao Valley and Needle, and Poohahaonao, Nakalaloa, and Kinihapai streams. It provides habitat for 3 populations of 100 mature, reproducing individuals of the long-lived perennial *H. arbuscula* and is currently occupied by 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep forested slopes and ridges in mesic forest dominated by *Metrosideros polymorpha* or *Diospyros sandwicensis*. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 16—*Hibiscus brackenridgei*—a

This unit is critical habitat for *Hibiscus brackenridgei* and is 212 ha (524 ac) on privately owned land. The unit contains Paleaanu and Kaonohoa gulches and Kaunoahua Ridge. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *H.*

*brackenridgei* and is currently occupied by 8 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, lowland dry forest, sometimes with *Erythrina sandwicensis* as the dominant tree. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Hibiscus brackenridgei*—b

This unit is critical habitat for *Hibiscus brackenridgei* and is 667 ha (1,645 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Olowalu Valley, Olowalu Stream, and Ukumehame. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *H. brackenridgei* and is currently occupied by 14 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, lowland dry forest, sometimes with *Erythrina sandwicensis* as the dominant tree. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 6—*Ischaemum byrhone*—a

This unit is critical habitat for *Ischaemum byrhone* and is 18 ha (42 ac) on State and privately owned land. The unit contains Kopiliula Stream, Kapaula Gulch, Waiaaka Stream, Waiohue Bay and Paakea Gulch. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *I. byrhone* and is currently occupied by fewer than 10 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, close proximity to the ocean, among rocks or on basalt cliffs in windward coastal dry shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the



expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 7—*Ischaemum byrone*—b**

This unit is critical habitat for *Ischaemum byrone* and is 11 ha (27 ac) on State-owned land (Waianapanapa State Park). The unit contains Pailoa and Keawaiki Bays, and Pukaulaa Point. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *I. byrone* and is currently occupied by 50 to 100 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, close proximity to the ocean, among rocks or on basalt cliffs in windward coastal dry shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Isodendron pyrifolium*—a**

This unit is critical habitat for *Isodendron pyrifolium* and is 224 ha (555 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Olowalu Valley, Olowalu Stream, and Ukumehame. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *I. pyrifolium* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, close proximity to the ocean, among rocks or on basalt cliffs in windward coastal dry shrubland. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Lipochaeta kamolensis*—a**

This unit is critical habitat for *Lipochaeta kamolensis* and is 1,474 ha (3,644 ac) on State and privately owned land. The unit contains Lualailua Hills

and Manawainui, Kamole, and Palaha gulches. It provides habitat for 4 populations of 300 mature, reproducing individuals of the short-lived perennial *L. kamolensis* and is currently occupied by 100 to 200 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, gulches or gentle slopes outside gulches in dry shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are of an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 11—*Lipochaeta kamolensis*—b**

This unit is critical habitat for *Lipochaeta kamolensis* and is 42 ha (105 ac) on State-owned land. The unit contains Pahihi Gulch. It, in combination with Haleakala Ranch lands, provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *L. kamolensis* and is currently unoccupied. This unit is essential to the conservation of the species because it supports habitat that is necessary to the establishment of additional populations on Maui in order to reach recovery goals. The habitat features contained in this unit that are essential for this species include, but are not limited to, gulches or gentle slopes outside gulches in dry shrubland. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is some distance away from the other critical habitat for this species in order to avoid all recovery populations from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Lysimachia lydgatei*—a**

This unit is critical habitat for *Lysimachia lydgatei* and is 90 ha (221 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Lihau Summit and Olowalu Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *L. lydgatei* and is currently occupied by 50 to 100 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of steep ridges in

*Metrosideros polymorpha-Dicranopteris linearis*-dominated wet to mesic shrubland or *M. polymorpha-Cheirodendron* sp. montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Lysimachia lydgatei*—b**

This unit is critical habitat for *Lysimachia lydgatei* and is 158 ha (391 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Pohakea Gulch and Hanaula Summit. It, in combination with Haleakala Ranch lands, provides habitat for 4 populations of 300 mature, reproducing individuals of the short-lived perennial *L. lydgatei* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of steep ridges in *Metrosideros polymorpha-Dicranopteris linearis*-dominated wet to mesic shrubland or *M. polymorpha-Cheirodendron* sp. montane forest. This unit is essential to the conservation of the species because, in combination with Haleakala Ranch, it provides for four populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Lysimachia lydgatei*—c**

This unit is critical habitat for *Lysimachia lydgatei* and is 47 ha (116 ac) on State (Panaewa Section of the West Maui NAR) and privately owned land. The unit contains no named natural features. It, in combination with Haleakala Ranch Lands, provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *L. lydgatei* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of steep ridges in *Metrosideros polymorpha-Dicranopteris linearis*-dominated wet to mesic shrubland or *M. polymorpha-Cheirodendron* sp. montane forest. This unit is essential to the conservation of the species because, in combination with Haleakala Ranch, it provides for

one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Lysimachia lydgatei*—d

This unit is critical habitat for *Lysimachia lydgatei* and is 98 ha (242 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Helu Summit. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *L. lydgatei* and is currently occupied by 40 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of steep ridges in *Metrosideros polymorpha-Dicranopteris linearis*-dominated wet to mesic shrubland or *M. polymorpha-Cheirodendron* sp. montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Lysimachia lydgatei*—e

This unit is critical habitat for *Lysimachia lydgatei* and is 18 ha (44 ac) on State-owned land (West Maui Forest Reserve). The unit contains Halepohaku Summit. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *L. lydgatei* and is currently occupied by 50 to 100 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, sides of steep ridges in *Metrosideros polymorpha-Dicranopteris linearis*-dominated wet to mesic shrubland or *M. polymorpha-Cheirodendron* sp. montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 6—*Mariscus pennatiformis*—a

This unit is critical habitat for *Mariscus pennatiformis* and is 30 ha (74 ac) on State and privately owned land. The unit contains Pahiha Point, Kopiliula Stream, Paakea Gulch, Waiohue Bay, Waiaaka Stream, Kapaula Gulch, and Hanawi Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *M. pennatiformis* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, cliffs with brown soil and talus within reach of ocean spray. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 13—*Melicope adscendens*—a

This unit is critical habitat for *Melicope adscendens* and is 160 ha (398 ac) on State (Kanaio NAR) land. The unit contains no named natural features. It, in combination with Ulupalakua Ranch land, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *M. adscendens* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, aa lava with pockets of soil in *Nestegis sandwicensis-Pleomele auwahiensis-Dodonaea viscosa* lowland mesic forest or open dry forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat designated to reach the recovery goal of 8 to 10 populations, this species is a very narrow endemic and probably never naturally occurred in more than a single or a few populations.

Maui 8—*Melicope balloui*—a

This unit is critical habitat for *Melicope balloui* and is 151 ha (373 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Puu o Kaka. It, in combination with Waikamoi Preserve land, provides habitat for one population of 100 mature, reproducing individuals of the

long-lived perennial *M. balloui* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is of an appropriate size so that each potential population within the unit is geographically separated enough to avoid their destruction by one naturally occurring catastrophic event.

Maui 9—*Melicope balloui*—b

This unit is critical habitat for *Melicope balloui* and is 394 ha (972 ac) on federally owned land (Haleakala National Park). The unit contains Kipahulu Valley and Palikea Stream. It provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *M. balloui* and is currently occupied by 10 to 50 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, mesic to wet forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Melicope knudsenii*—a

This unit is critical habitat for *Melicope knudsenii* and is 28 ha (69 ac) on State-owned land (Kanaio NAR). The unit contains no named natural features. It, in combination with Ulupalakua Ranch land, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *M. knudsenii* and is currently occupied by 12 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, forested flats or talus slopes in *Nestegis sandwicensis-Pleomele* sp. mixed open dry forests. This unit is essential to the conservation of the species because it supports an extant

colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 13—*Melicope knudsenii*—b**

This unit is critical habitat for *Melicope knudsenii* and is 163 ha (403 ac) on State-owned land. The unit contains no named natural features. This unit is essential to the conservation of the species because, in combination with Ulupalakua Ranch, it provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *M. knudsenii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, forested flats or talus slopes in *Nestegis sandwicensis*-*Pleomele* sp. mixed open dry forests. This unit, in combination with Ulupalakua Ranch, provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Melicope mucronulata*—a**

This unit is critical habitat for *Melicope mucronulata* and is 34 ha (83 ac) on State-owned land (Kanaio NAR). The unit contains no named natural features. It, in combination with Ulupalakua Ranch, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *M. mucronulata* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, gentle south-facing slopes in lowland dry to mesic forest. This unit is essential to the conservation of the species because, in combination with Haleakala Ranch, it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 13—*Melicope mucronulata*—b**

This unit is critical habitat for *Melicope mucronulata* and is 194 ha (481 ac) on State-owned land. The unit

contains no named natural features. It, in combination with Ulupalakua Ranch, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *M. mucronulata* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, gentle south-facing slopes in lowland dry to mesic forest. This unit is essential to the conservation of the species because, in combination with Ulupalakua Ranch, it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Melicope ovalis*—a**

This unit is critical habitat for *Melicope ovalis* and is 934 ha (2,306 ac) on State and Federal (Haleakala National Park) land. The unit contains Kipahulu Valley, Palikea Stream, and Kaukai Gulch. It provides habitat for 3 populations of 100 mature, reproducing individuals of the long-lived perennial *M. ovalis* and is currently occupied by 250 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Acacia koa* and *Metrosideros polymorpha*-dominated montane wet forests along streams. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is of an appropriate size so that each potential populations important for the conservation of the species within the unit is geographically separated enough to avoid their destruction by one naturally occurring catastrophic event.

**Maui 9—*Neraudia sericea*—a**

This unit is critical habitat for *Neraudia sericea* and is 623 ha (1,539 ac) on State-owned land. The unit contains Manawainui Gulch, Kamole Gulch and Puu Pane. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *N. sericea* and is currently occupied by 4 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry to

mesic *Metrosideros polymorpha*-*Dodonaea viscosa*-*Leptecophylla tameiameiae* shrubland or forest or *Acacia koa* forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Neraudia sericea*—b**

This unit is critical habitat for *Neraudia sericea* and is 1,188 ha (2,938 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Olowalu Valley, Pohakea, and Lihau, Hokuula, and Halepohaku summits. It provides habitat for 4 populations of 300 mature, reproducing individuals of the short-lived perennial *N. sericea* and is currently occupied by one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry to mesic *Metrosideros polymorpha*-*Dodonaea viscosa*-*Leptecophylla tameiameiae* shrubland or forest or *Acacia koa* forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all recovery populations on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Nototrichium humile*—a**

This unit is critical habitat for *Nototrichium humile* and is 397 ha (982 ac) on State (DHHL) and privately owned land. The unit contains Lualailua Hills. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *N. humile* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, old cinder cones in dry shrubland. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being

destroyed by one naturally occurring catastrophic event.

Maui 4—*Peucedanum sandwicense*—a

This unit is critical habitat for *Peucedanum sandwicense* and is 1 ha (2 ac) on State-owned land. The unit contains all of Keopuka Rock. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. sandwicense* and is currently occupied by 20 to 30 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, sparsely vegetated steep to vertical cliff habitats with little soil in mesic or coastal communities. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Peucedanum sandwicense*—b

This unit is critical habitat for *Peucedanum sandwicense* and is 117 ha (289 ac) on privately owned land. The unit contains Iao Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. sandwicense* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, sparsely vegetated steep to vertical cliff habitats with little soil in mesic or coastal communities. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Phlegmariurus mannii*—a

This unit is critical habitat for *Phlegmariurus mannii* and is 221 ha (548 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Puu o Kakae and Opana Gulch. It, in combination with Waikamoi Preserve, provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently occupied by at least one plant. The habitat features contained in this

unit that are essential for this species include, but are not limited to, epiphytic growth on *Metrosideros polymorpha*, *Dodonaea viscosa*, or *Acacia koa* trees in moist protected gulches or mossy tussocks in mesic to wet montane *M. polymorpha*-*Acacia koa* forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Phlegmariurus mannii*—b

This unit is critical habitat for *Phlegmariurus mannii* and is 383 ha (947 ac) on State-owned land. The unit contains Manawainui Gulch. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, epiphytic growth on *Metrosideros polymorpha*, *Dodonaea viscosa*, or *Acacia koa* trees in moist protected gulches or mossy tussocks in mesic to wet montane *M. polymorpha*-*Acacia koa* forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 9—*Phlegmariurus mannii*—c

This unit is critical habitat for *Phlegmariurus mannii* and is 476 ha (1,176 ac) on State (Kipahulu Forest Reserve) and federally owned land (Haleakala National Park). The unit contains Puu Anulili and Manawainui Gulch. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, epiphytic growth on *Metrosideros polymorpha*, *Dodonaea viscosa*, or *Acacia koa* trees in moist protected gulches or mossy tussocks in mesic to wet montane *M. polymorpha*-

*Acacia koa* forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Phlegmariurus mannii*—d

This unit is critical habitat for *Phlegmariurus mannii* and is 57 ha (141 ac) on State (Honokowai Section of the West Maui NAR) and privately owned land. The unit contains Amahu and Kanaha streams. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, epiphytic growth on *Metrosideros polymorpha*, *Dodonaea viscosa*, or *Acacia koa* trees in moist protected gulches or mossy tussocks in mesic to wet montane *M. polymorpha*-*Acacia koa* forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Phlegmariurus mannii*—e

This unit is critical habitat for *Phlegmariurus mannii* and is 35 ha (87 ac) on State (Lihau Section of the West Maui NAR and West Maui Forest Reserve) and privately owned land. The unit contains Lihau Summit. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, epiphytic growth on *Metrosideros polymorpha*, *Dodonaea viscosa*, or *Acacia koa* trees in moist protected gulches or mossy tussocks in mesic to wet montane *M. polymorpha*-*Acacia koa* forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present

population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 8—*Phyllostegia mannii*—a**

This unit is critical habitat for *Phyllostegia mannii* and is 570 ha (1,408 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Opana Gulch and Waikamoi, Honomanu, Haipuaena, and Puohakamau streams. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *P. mannii* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, gentle slopes and the steep sides of gulches in mesic to wet forest dominated by *Acacia koa* and/or *Metrosideros polymorpha*. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 8—*Phyllostegia mollis*—a**

This unit is critical habitat for *Phyllostegia mollis* and is 128 ha (316 ac) on State-owned land (Makawao Forest Reserve). The unit contains Opana Gulch. It provides habitat for one population in combination with Haleakala Ranch land of 300 mature, reproducing individuals of the short-lived perennial *P. mollis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep slopes and gulches in mesic forest dominated by *Metrosideros polymorpha* and/or *Acacia koa*. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Phyllostegia mollis*—b**

This unit is critical habitat for *Phyllostegia mollis* and is 509 ha (1,256 ac) on State-owned land. The unit

contains Puu Pane. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *P. mollis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep slopes and gulches in mesic forest dominated by *Metrosideros polymorpha* and/or *Acacia koa*. This unit is essential to the conservation of the species because it provides for two populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Plantago princeps*—a**

This unit is critical habitat for *Plantago princeps* and is 164 ha (406 ac) on federally owned land (Haleakala National Park). The unit contains Haleakala Summit and Kaopo Gap. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. princeps* and is currently occupied by 44 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, basalt cliffs that are windblown with little vegetation in *Metrosideros polymorpha* lowland wet forest, *Acacia koa*-*M. polymorpha* montane wet forest, or *M. polymorpha* montane wet shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Plantago princeps*—b**

This unit is critical habitat for *Plantago princeps* and is 327 ha (807 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Iao Valley and Kahoolewa Ridge. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. princeps* and is currently occupied by 51 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, basalt cliffs that are windblown with little vegetation in *Metrosideros polymorpha* lowland wet forest, *Acacia koa*-*M. polymorpha* montane wet forest, or *M.*

*polymorpha* montane wet shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Platanthera holochila*—a**

This unit is critical habitat for *Platanthera holochila* and is 240 ha (596 ac) on State (Hana Forest Reserve) and federally owned land (Haleakala National Park). The unit contains Anapanapa Lake and Kalapawili Ridge. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. holochila* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha*-*Dicranopteris linearis* montane wet forest, *M. polymorpha* mixed montane bog, or mesic scrubby *M. polymorpha* forest. This unit is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Platanthera holochila*—b**

This unit is critical habitat for *Platanthera holochila* and is 8 ha (19 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains no named natural features. It, in combination with Maui 17—*Platanthera holochila*—c, provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. holochila* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha*-*Dicranopteris linearis* montane wet forest, *M. polymorpha* mixed montane bog, or mesic scrubby *M. polymorpha* forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the

conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Platanthera holochila*—c**

This unit is critical habitat for *Platanthera holochila* and is 189 ha (466 ac) on State (Honokowai Section of the West Maui NAR) and privately owned land. The unit contains Kapaloa and Amala streams. It, in combination with Maui 17—*Platanthera holochila*—b, provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. holochila* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, *Metrosideros polymorpha-Dicranopteris linearis* montane wet forest, *M. polymorpha* mixed montane bog, or mesic scrubby *M. polymorpha* forest. This unit, in combination with Maui 17—*Platanthera holochila*—b, is essential to the conservation of the species because it provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Pteris lidgatei*—a**

This unit is critical habitat for *Pteris lidgatei* and is 1,168 ha (2,887 ac) on State (Kahakuloa Section of the West Maui NAR) and privately owned land. The unit contains Eke Crater, Keahikaou Summit, and Mananole Stream. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *P. lidgatei* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep stream banks in wet *Metrosideros polymorpha-Dicranopteris linearis* montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Pteris lidgatei*—b**

This unit is critical habitat for *Pteris lidgatei* and is 163 ha (403 ac) on privately owned land. The unit contains

Kauaula Valley. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *P. lidgatei* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep stream banks in wet *Metrosideros polymorpha-Dicranopteris linearis* montane forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Remya mauiensis*—a**

This unit is critical habitat for *Remya mauiensis* and is 228 ha (564 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains Ukumehame Valley and Hanaulaiki. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *R. mauiensis* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, north or northeast-facing slopes in mixed mesophytic forests or *Metrosideros polymorpha* montane wet forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 17—*Remya mauiensis*—b**

This unit is critical habitat for *Remya mauiensis* and is 567 ha (1,400 ac) on State (West Maui Forest Reserve and Panaewa Section of the West Maui NAR) and privately owned land. The unit contains Wahikuli and Puuiki Gulches and Kula Valley. It provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *R. mauiensis* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to,

steep, north or northeast-facing slopes in mixed mesophytic forests or *Metrosideros polymorpha* montane wet forests. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 17—*Remya mauiensis*—c**

This unit is critical habitat for *Remya mauiensis* and is 31 ha (78 ac) on State (West Maui Forest Reserve and Honokowai Section of the West Maui NAR) and privately owned land. The unit contains Honokowai Valley. It, in combination with Maui 18—*Remya mauiensis*—d and Kapunakea Preserve, provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *R. mauiensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, north or northeast-facing slopes in mixed mesophytic forests or *Metrosideros polymorpha* montane wet forests. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 18—*Remya mauiensis*—d**

This unit is critical habitat for *Remya mauiensis* and is 2 ha (6 ac) on State (West Maui Forest Reserve) and privately owned land. The unit contains no named natural features. It, in combination with Maui 17—*Remya mauiensis*—c and Kapunakea Preserve, provides habitat for two populations of 300 mature, reproducing individuals of the short-lived perennial *R. mauiensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, north or northeast-facing slopes in mixed mesophytic forests or *Metrosideros polymorpha* montane wet forests. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because

they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 17—*Sanicula purpurea*—a**

This unit is critical habitat for *Sanicula purpurea* and is 34 ha (83 ac) on State (Kahakuloa Section of the West Maui NAR) and privately owned land. The unit contains Eke Crater. It, in combination with Maui 17—*Sanicula purpurea*—c, provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *S. purpurea* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, open *Metrosideros polymorpha* mixed montane bogs. This unit is essential to the conservation of the species because it, in combination with Maui 17—*Sanicula purpurea*—c, provides for one population within this multi-island species' historical range on Maui that is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Sanicula purpurea*—b**

This unit is critical habitat for *Sanicula purpurea* and is 306 ha (756 ac) on State (Panaewa and Honokowai Sections of the West Maui NAR) and privately owned land. The unit contains Kahoolewa, Kahoolewa Ridge, Puu Kukui Summit, and Violet Lake. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *S. purpurea* and is currently occupied by 70 to 150 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, open *Metrosideros polymorpha* mixed montane bogs. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 17—*Sanicula purpurea*—c**

This unit is critical habitat for *Sanicula purpurea* and is 8 ha (19 ac) on privately owned land. The unit contains no named natural features. It, in combination with Maui 17—*Sanicula purpurea*—a, provides habitat for one population of 300 mature, reproducing

individuals of the short-lived perennial *S. purpurea* and is currently occupied by 50 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, open *Metrosideros polymorpha* mixed montane bogs. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 9—*Schiedea haleakalensis*—a**

This unit is critical habitat for *Schiedea haleakalensis* and is 26 ha (64 ac) on federally owned land (Haleakala National Park). The unit is located in Haleakala Crater. It provides habitat for one population of 300 mature, reproducing individuals of the long-lived perennial *S. haleakalensis* and is currently occupied by 20 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock cracks on sheer cliffs adjacent to barren lava; subalpine shrublands and grasslands with cinder, weathered volcanic ash; or bare lava substrate with little or no soil development and periodic freezing temperatures. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 9—*Schiedea haleakalensis*—b**

This unit is critical habitat for *Schiedea haleakalensis* and is 77 ha (189 ac) on federally owned land (Haleakala National Park). The unit is located in Haleakala Crater. It provides habitat for one population of 300 mature, reproducing individuals of the long-lived perennial *S. haleakalensis* and is currently occupied by at least one plant. The habitat features contained in this unit that are essential for this species include, but are not limited to, rock cracks on sheer cliffs adjacent to barren lava; subalpine shrublands and grasslands with cinder, weathered volcanic ash; or bare lava substrate with

little or no soil development and periodic freezing temperatures. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

**Maui 1—*Sesbania tomentosa*—a**

This unit is critical habitat for *Sesbania tomentosa* and is 38 ha (94 ac) on non-managed State and privately owned land. The unit contains Honanana Gulch, Alapapa Gulch, Mokolea Point, and Papanahoa Gulch. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *Sesbania tomentosa* and is currently occupied by 30 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, windswept slopes, sea cliffs, and cinder cones in *Scaevola taccada* coastal dry shrublands. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

**Maui 13—*Sesbania tomentosa*—b**

This unit is critical habitat for *Sesbania tomentosa* and is 79 ha (195 ac) on State-owned land. The unit contains Pimoe and Pohakea summits. This unit provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *Sesbania tomentosa* and is currently occupied by 13 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, windswept slopes, sea cliffs, and cinder cones in *Scaevola taccada* coastal dry shrublands. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the



island from being destroyed by one naturally occurring catastrophic event.

Maui 13—*Spermolepis hawaiiensis*—a

This unit is critical habitat for *Spermolepis hawaiiensis* and is 91 ha (224 ac) on State (Kanaio NAR) land. The unit contains no named natural features. It provides habitat for one population of 500 mature, reproducing individuals of the annual *S. hawaiiensis* and is currently occupied by 100 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, shady spots in *Dodonaea viscosa* lowland dry shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Spermolepis hawaiiensis*—b

This unit is critical habitat for *Spermolepis hawaiiensis* and is 23 ha (56 ac) on State-owned land (Lihau Section of the West Maui NAR). The unit contains Olowalu Valley. It provides habitat for one population of 500 mature, reproducing individuals of the annual *S. hawaiiensis* and is currently occupied by 300 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, shady spots in *Dodonaea viscosa* lowland dry shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 17—*Tetramolopium capillare*—a

This unit is critical habitat for *Tetramolopium capillare* and is 1,782 ha (4,404 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Halepohaku, Hanaulaiki, Helu, Koai, Lihau, Luakoi, and Ulaula summits. It provides habitat for 6 populations of 300 mature, reproducing individuals of the short-lived perennial *T. capillare* and is currently occupied by 50 to 100 plants. The habitat features

contained in this unit that are essential for this species include, but are not limited to, rocky substrates in *Heteropogon contortus* lowland dry forest. This unit is essential to the conservation of the species because it supports an extant colony of this species, includes habitat that is important for the expansion of the present population, and is the only habitat essential for the conservation of this species on Maui. Although we do not feel that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, this unit is of an appropriate size so that each potential populations important for the conservation of the species within the unit is geographically separated enough to avoid their destruction by one naturally occurring event.

Maui 17—*Tetramolopium remyi*—a

This unit is critical habitat for *Tetramolopium remyi* and is 287 ha (712 ac) on State (Lihau Section of the West Maui NAR, West Maui Forest Reserve) and privately owned land. The unit contains Olowalu Stream and Valley. It provides habitat for 3 populations of 300 mature, reproducing individuals of the short-lived perennial *T. remyi* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, red sandy loam soil in dry *Dodonaea viscosa*-*Heteropogon contortus* communities. This unit is essential to the conservation of the species because it provides for three populations within this multi-island species' historical range on Maui that are some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species from being destroyed by one naturally occurring catastrophic event.

Maui 12—*Vigna o-wahuensis*—a

This unit is critical habitat for *Vigna o-wahuensis* and is 144 ha (356 ac) on State-owned land. The unit contains area east of Kamanamana Point. It provides habitat for one population of 300 mature, reproducing individuals of the short-lived perennial *V. o-wahuensis* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, dry or mesic grassland or shrubland. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It

is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Maui 8—*Zanthoxylum hawaiiense*—a

This unit is critical habitat for *Zanthoxylum hawaiiense* and is 363 ha (895 ac) on State (Makawao Forest Reserve) and privately owned land. The unit contains Kahakapao Stream. It provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *Z. hawaiiense* and is currently occupied by 3 plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, open lowland dry or mesic *Nestegis sandwicensis*-*Pleomele auwahiensis* forests or *Acacia koa*-*Pleomele auwahiensis* forest, or montane dry forest. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. It is some distance away from the other critical habitat for this species, in order to avoid all populations important for the conservation of the species on the island from being destroyed by one naturally occurring catastrophic event.

Kahoolawe 1—*Kanaloa kahoolawensis*—a

This unit is critical habitat for *Kanaloa kahoolawensis* and is 562 ha (1,388 ac) on State (KIRC) land. The unit contains Keana Keiki, Laa o Kealaikahiki, Honukanaeae, and Wai Honu Gulch. This unit provides habitat for two populations of 100 mature, reproducing individuals of the long-lived perennial *K. kahoolawensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, rocky talus slopes. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

Kahoolawe 2—*Kanaloa kahoolawensis*—b

This unit is critical habitat for *Kanaloa kahoolawensis* and is 613 ha (1,515 ac) on State (KIRC) land. The unit contains Aleale, Kunaka Cave, Kamohio Bay, Iliililoa, Lae o Kuakaiwa, Lae O Kaka, Lae o Halona, Keoheuli Bay,

Kaukamaka Gulch, Pali o Kalapakea, Kalua o Kamohoalii, Hula Kao, and Lae o ka Ule. This unit provides habitat for 4 populations of 100 mature, reproducing individuals of the long-lived perennial *K. kahoolawensis* and is currently occupied by two plants. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, rocky talus slopes. This unit is essential to the conservation of the species because it supports an extant colony of this species and includes habitat that is important for the expansion of the present population. Although we do not feel that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are of an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

#### Kahoolawe 3—*Kanaloa kahoolawensis*—c

This unit is critical habitat for *Kanaloa kahoolawensis* and is 5 ha (12 ac) on State (KIRC) land. The unit contains the entirety of Puu Koae Islet. This unit, in combination with a portion of Kahoolawe 2—*Kanaloa kahoolawensis*—b, provides habitat for one population of 100 mature, reproducing individuals of the long-lived perennial *K. kahoolawensis* and is currently unoccupied. The habitat features contained in this unit that are essential for this species include, but are not limited to, steep, rocky talus slopes. Although we do not believe that there is enough habitat that currently exists to reach the recovery goal of 8 to 10 populations for this island-endemic species, the units are essential because they are an appropriate distance apart to avoid their destruction by one naturally occurring catastrophic event.

### Effects of Critical Habitat Designation

#### Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal action agency must enter into consultation with us. Section 7(a)(4) of the Act requires Federal agencies (action agency) to confer with us on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. Destruction or adverse modification of critical habitat

occurs when a Federal action directly or indirectly alters critical habitat to the extent that it appreciably diminishes the value of critical habitat for the conservation of the species. Individuals, organizations, States, local governments, and other non-Federal entities are affected by the designation of critical habitat when their actions occur on Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate formal consultation on previously reviewed actions under certain circumstances, including instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement, or control has been retained or is authorized by law. Consequently, some Federal agencies may request reinitiation of consultation or conferencing with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat.

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide “reasonable and prudent alternatives” to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency’s legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid the likelihood of the destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Activities on Federal lands that may affect the critical habitat of one or more of the 60 plant species from Maui and Kahoolawe will require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act (33 U.S.C. 1344 *et seq.*) the Department of Housing and Urban Development, or a section 10(a)(1)(B)

permit from us; or some other Federal action, including funding (*e.g.*, from the Federal Highway Administration, Federal Aviation Administration (FAA), Federal Emergency Management Agency (FEMA), Environmental Protection Agency (EPA), or Department of Energy), regulation of airport improvement activities by the FAA; and construction of communication sites licensed by the Federal Communications Commission, may also be subject to the section 7 consultation process. Federal actions not affecting critical habitat and actions on non-Federal lands that are not federally funded, authorized, or permitted would not require section 7 consultation as a result of this rule designating critical habitat.

Section 4(b)(8) of the Act requires us to briefly describe and evaluate in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may adversely modify such habitat or that may be affected by such designation. We note that such activities may also jeopardize the continued existence of the species.

Activities that, when carried out, funded, or authorized by a Federal agency, may directly or indirectly destroy or adversely modify critical habitat include, but are not limited to:

(1) Activities that appreciably degrade or destroy the primary constituent elements including, but not limited to: Overgrazing; maintenance of feral ungulates; clearing or cutting of native live trees and shrubs, whether by burning or mechanical, chemical, or other means (*e.g.*, woodcutting, bulldozing, construction, road building, mining, herbicide application); introducing or enabling the spread of nonnative species; and taking actions that pose a risk of fire;

(2) Activities that alter watershed characteristics in ways that would appreciably reduce groundwater recharge or alter natural, dynamic wetland or other vegetative communities. Such activities may include manipulation of vegetation, such as timber harvesting, residential and commercial development, and grazing of livestock that degrades watershed values;

(3) Rural residential construction that includes concrete pads for foundations and the installation of septic systems in wetlands where a permit under section 404 of the Clean Water Act would be required by the Corps;

(4) Recreational activities that appreciably degrade vegetation;

(5) Mining of sand or other minerals;

(6) Introducing or encouraging the spread of nonnative plant species into critical habitat units; and

(7) Importation of nonnative species for research, agriculture, and aquaculture, and the release of biological control agents that would have unanticipated deleterious effects on the listed species and the primary constituent elements of their habitats.

If you have questions regarding whether specific activities will likely constitute adverse modification of critical habitat, contact the Field Supervisor, Pacific Islands Ecological Services Field Office (*see ADDRESSES* section). Requests for copies of the regulations on listed plants and animals, and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Division of Endangered Species, 911 N.E. 11th Ave., Portland, OR 97232-4181 (telephone 503/231-2063; facsimile 503/231-6243).

#### *Analysis of Managed Lands Under Section 3(5)(A)*

Pursuant to the definition of critical habitat in section 3(5)(A) of the Act, the primary constituent elements as found in any area so designated must also require "special management considerations or protections."

Adequate special management or protection is provided by a legally operative plan that addresses the maintenance and improvement of the essential elements and provides for the long-term conservation of the species. We consider a plan adequate when it: (1) Provides a conservation benefit to the species (*i.e.*, the plan must maintain or provide for an increase in the species' population or the enhancement or restoration of its habitat within the area covered by the plan); (2) provides assurances that the management plan will be implemented (*i.e.*, those responsible for implementing the plan are capable of accomplishing the objectives, have an implementation schedule and have adequate funding for the management plan); and, (3) provides assurances that the conservation plan will be effective (*i.e.*, it identifies biological goals, has provisions for reporting progress, and is of a duration sufficient to implement the plan and achieve the plan's goals and objectives). If an area is covered by a plan that meets these criteria, it does not constitute critical habitat as defined by the Act because the primary constituent elements found there are not in need of special management or protection.

Currently occupied and historically known sites containing one or more of the primary constituent elements considered essential to the conservation

of these 60 plant species were examined to determine the adequacy of special management considerations or protection are required and, consequently, whether such areas meet the definition of critical habitat under section 3(5)(A). We reviewed all available management information on these plants at these sites, including published reports and surveys; annual performance and progress reports; management plans; grants; memoranda of understanding and cooperative agreements; DOFAW planning documents; internal letters and memos; biological assessments and environmental impact statements; and section 7 consultations. Additionally, we contacted the major private landowners on Maui and Kahoolawe by mail and we met with several landowners between the publication of the revised proposal on April 3, 2002, and the end of the comment period on September 30, 2002, to discuss their current management for the plants on their lands. We also met with Maui District DOFAW staff to discuss management activities they are conducting on Maui. In addition, we reviewed new biological information and public comments received during the public comment periods and at the public hearing.

In determining whether a management plan or agreement provides adequate management or protection, we first consider whether that plan provides a conservation benefit to the species. We considered the following threats and associated recommended management actions:

(1) The factors that led to the listing of the species, as described in the final rules for listing each of the species. Effects of clearing and burning for agricultural purposes and of invasive non-native plant and animal species have contributed to the decline of nearly all endangered and threatened plants in Hawaii (Cuddihy and Stone 1990; Howarth 1985; Loope 1998; Scott *et al.* 1986; Service 1994, 1995, 1996, 1997, 1998a, 1998b, 1998c, 1999, 2001; Smith 1985; Stone 1985; Vitousek 1992; Wagner *et al.* 1985).

Current threats to these species include nonnative grass- and shrub-carried wildfire; browsing, digging, rooting, and trampling from feral ungulates (including axis deer, goats, cattle, and pigs); direct and indirect effects of nonnative plant invasions, including alteration of habitat structure and microclimate; and disruption of pollination and gene-flow processes by adverse effects of mosquito-borne avian disease on forest bird pollinators, direct competition between native and non-

native insect pollinators for food, and predation of native insect pollinators by non-native hymenopteran insects (ants). In addition, physiological processes such as reproduction and establishment continue to be negatively affected by fruit- and flower-eating pests such as non-native arthropods, molluscs, and rats, and photosynthesis and water transport are affected by non-native insects, pathogens, and diseases. Many of these factors interact with one another, thereby compounding effects. Such interactions include non-native plant invasions altering wildfire regimes, feral ungulates carrying weeds and disturbing vegetation and soils, thereby facilitating dispersal and establishment of nonnative plants, and numerous nonnative insect species feeding on native plants, thereby increasing their vulnerability and exposure to pathogens and disease (Bruegmann *et al.* 2001; Cuddihy and Stone 1990; D'Antonio and Vitousek 1992; Howarth 1985; Mack 1992; Scott *et al.* 1986; Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001; Smith 1985; Tunison *et al.* 1992);

(2) The recommendations from the HPPRCC in their 1998 report to us ("Habitat Essential to the Recovery of Hawaiian Plants"). As summarized in this report, recovery goals for endangered Hawaiian plant species cannot be achieved without the effective control of non-native species threats, wildfire, and land use changes; and

(3) The management actions needed for assurance of survival and ultimate recovery of these plants. These actions are described in our recovery plans for these 60 species (Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001), in the 1998 HPPRCC report to us, and in various other documents and publications relating to plant conservation in Hawaii (Cuddihy and Stone 1990; Mueller-Dombois 1985; Smith 1985; Stone 1985; Stone *et al.* 1992). In addition to monitoring the plant populations, these actions include, but are not limited to: (1) Feral ungulate control; (2) non-native plant control; (3) rodent control; (4) invertebrate pest control; (5) fire management; (6) maintenance of genetic material of the endangered and threatened plant species; (7) propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of these species; (8) ongoing management of the wild, outplanted, and augmented populations; and (9) habitat management and restoration in areas deemed essential for the recovery of these species.

In general, taking all of the above recommended management actions into account, the following management actions are important in providing a conservation benefit to the species: Feral ungulate control; wildfire management; non-native plant control; rodent control; invertebrate pest control; maintenance of genetic material of the endangered and threatened plant species; propagation, reintroduction, and augmentation of existing populations into areas deemed essential for the recovery of the species; ongoing management of the wild, outplanted, and augmented populations; maintenance of natural pollinators and pollinating systems, when known; habitat management and restoration in areas deemed essential for the recovery of the species; monitoring of the wild, outplanted, and augmented populations; rare plant surveys; and control of human activities/access (Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). On a case-by-case basis, these actions may rise to different levels of importance for a particular species or area, depending on the biological and physical requirements of the species and the location(s) of the individual plants.

As shown in Table 2, the 60 species of plants are found on Federal, State, and private lands on the islands of Maui and Kahoolawe. Information received in response to our public notices; meetings with landowners of Maui County and Maui District DOWAW staff; the December 18, 2000, and April 3, 2002, proposals; public comment periods; and the March 20, 2001, and September 12, 2002, public hearings; as well as information in our files, indicated that there is limited on-going conservation management action for these plants, except as noted below. Without management plans and assurances that the plans will be implemented, we are unable to find that the other areas do require special management or protection. The following discussion analyzes current management plans that provide a conservation benefit to the species to assess whether they meet the Service's requirements for adequate management or protection.

#### Federal Lands

The Sikes Act Improvements Act of 1997 (Sikes Act) requires each military installation that includes land and water suitable for the conservation and management of natural resources to complete, by November 17, 2001, an Integrated Natural Resources Management Plan (INRMP). An INRMP integrates implementation of the military mission of the installation with

stewardship of the natural resources found there. Each INRMP includes an assessment of the ecological needs on the installation, including needs to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. We consult with the military on the development and implementation of INRMPs for installations with listed species. We believe that bases that have completed and approved INRMPs that address the needs of the species generally do not meet the definition of critical habitat discussed above, because they require no additional special management or protection. Therefore, we do not include these areas in critical habitat designations if they meet the following three criteria: (1) A current INRMP must be complete and provide a conservation benefit to the species; (2) the plan must provide assurances that the conservation management strategies will be implemented; and (3) the plan must provide assurances that the conservation management strategies will be effective, by providing for periodic monitoring and revisions as necessary. If all of these criteria are met, then the lands covered under the plan would not meet the definition of critical habitat.

One species, *Sesbania tomentosa*, occurs on Kanaio Training Area (Hawaii Army National Guard) lands on the island of Maui, and we believe this land is essential for the conservation of this species. In 1998, funds were provided for protective fencing and monitoring of *Sesbania tomentosa* on this land. Since then, however, these management activities for *Sesbania tomentosa* have been curtailed due to a lack of funding (Lt. Col. Richard Young, Hawaii Army National Guard, *in litt.* 2000). Because appropriate conservation management strategies have not been adequately funded or effectively implemented for *Sesbania tomentosa* on this land, we cannot at this time find that management of this land under Federal jurisdiction is sufficient to find that they do not meet the definition of critical habitat. Therefore, this area has been included within the critical habitat units.

Contractors for the U.S. Navy are clearing the state-owned island of Kahoolawe of military ordnance utilizing Congressional funding that expires in 2003. The Navy has consulted with the Service under section 7 of the Act to ensure protection of threatened and endangered species during the clearance activities. In June 1998, the

State of Hawaii Kahoolawe Island Reserve Commission developed an environmental restoration plan for Kahoolawe (Social Science Research Institute, University of Hawaii 1998). The plan, however, does not address specific management actions to protect and conserve endangered plant species. While the island is isolated and remote, and access is restricted due to the presence of unexploded ordnance hazards, this action alone is not sufficient to indicate that special management is not required for the listed plant species, and areas on the island are included within the critical habitat units for *Kanaloa kahoolawensis*.

#### State of Hawaii Lands

##### *The Upper Areas of Hanawi Natural Area Reserve (HNAR)*

Three plant species, *Geranium multiflorum*, and *Clermontia samuelii* ssp. *hanaensis*, and *Cyanea mckelowneyi* are reported from the upper areas of HNAR (GDSI 2000; HINHP Database 2000). The HNAR was established in 1986, and comprises 3,035 ha (7,500 ac) of diverse native ecosystems and endangered forest bird habitat. The Department of Land and Natural Resources (DLNR) manages Natural Area Reserves, except that any use must be specifically approved by the Natural Area Reserve System Commission. The State holds Natural Area Reserves in trust and they may not be non-nativated except upon a finding by the DLNR of an imperative and unavoidable necessity. DLNR must provide public notice and conduct public hearings before revoking or modifying an executive order that sets aside lands for the reserve system (Haw. Rev. Stat. sections 195-1—195-11). The primary goals of the HNAR are to: (1) Protect the upper areas of the reserve by fencing smaller manageable units to restrict pig movements; (2) prevent degradation of native forest by reducing feral ungulate damage; and (3) improve or maintain the integrity of native ecosystems in selected areas of the preserve by reducing the effects of non-native plants.

Specific management actions to address feral ungulate impacts include the construction of fences, including strategic fencing of smaller manageable units, and staff hunting. Currently, the upper 809 ha (2,000 ac) has been fenced and pigs removed. Fences have been constructed along the western boundaries of the HNAR, along the 1,585 m (5,200 ft) contour to the east up to the Haleakala National Park boundary on State land. The Haleakala National

Park fence serves as the upper fence boundary for HNAR. Additionally, fences have been constructed to separate three distinct management units: Puu Alaea Unit, Poouli Unit, and Kuhiwai/Waielele Unit. Since the removal of pigs in these upper forest units of the HNAR, vegetation monitoring has been implemented to determine recovery of native plant species. Currently, a fence is being constructed along the 1,100 m (3,600 ft) contour of the HNAR which will comprise the "middle forest unit" (William Evanson, DLNR, pers. comm., 1999).

The nonnative plant control program within HNAR focuses on habitat-modifying nonnative plants (weeds). A weed priority list has been compiled for HNAR, and control and monitoring of the highest priority species are ongoing. Weeds are controlled manually, chemically, or through a combination of both. Monitoring transects help locate developing populations of other priority weed species and, if necessary, removal of these populations is conducted (DLNR 1989).

Because *Geranium multiflorum* and *Clermontia samuelii* ssp. *hanaenis* and their habitats within the upper areas of HNAR (above 1,525 m (5,000 ft) elevation) are permanently protected and managed by State law and because the continued successful management of this area is assured by State funding, HRS 195-9 (Natural Area Reserve Fund; Heritage Program; established) establishes in the state treasury a special fund known as the natural area reserve fund to implement the purposes of this chapter, including the identification, establishment, and management of natural area reserves \* \* \* the fund shall be administered by the department [DLNR]. Since its establishment, DLNR has received funding for this program each year from the Legislature and funding for natural resource programs such as this is a high priority and unlikely to be discontinued (Randy Kennedy, Native Resource Program Manager, DOFAW, pers. comm. 2003). This area is not in need of special management considerations or protection. Therefore, we have determined that the State land within the upper areas of HNAR does not meet the definition of critical habitat in the Act, and we are not designating this area as critical habitat. Should the status of this reserve change, for example by revocation or modification of the NAR, we will reconsider whether it then meets the definition of critical habitat. If so, we have the authority to propose to amend critical habitat to include such area at that time (50 CFR 424.12(g)) as workload and resources allow.

#### Private Lands

*The Nature Conservancy of Hawaii's Waikamoi and Kapunakea Preserves, which are located on the northeastern slopes of Haleakala and in the West Maui mountains, respectively*

Lands within The Nature Conservancy of Hawaii's (TNCH) Maui preserves were not included within proposed critical habitat. Sixteen species (*Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bonamia menziesii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea lobata*, *Diplazium molokaiense*, *Geranium arboreum*, *Geranium multiflorum*, *Melicope balloui*, *Phlegmariurus munnii*, *Plantago princeps*, *Platanthera holochila*, *Remya mauiensis*, and *Sanicula purpurea*) are reported from TNCH's Waikamoi and Kapunakea Preserves, which are located on the northeastern slopes of Haleakala and in the West Maui mountains, respectively (TNCH 1997, 1998; GDSI 2000; HINHP Database 2000). Both preserves were established by grants of perpetual conservation easements from the private landowners to TNCH and are included in the State's Natural Area Partnership (NAP) program, which provides matching funds for the management of private lands that have been permanently dedicated to conservation (TNCH 1997, 1998).

Under the NAP program, the State of Hawaii provides matching funds on a two-for-one basis for management of private lands dedicated to conservation. In order to qualify for this program, the land must be dedicated in perpetuity through transfer of fee title or a conservation easement to the State or a cooperating entity. The land must be managed by the cooperating entity or a qualified landowner according to a detailed management plan approved by the Board of Land and Natural Resources. Once approved, the six-year partnership agreement between the State and the managing entity is automatically renewed each year so that there are always six years remaining in the term, although the management plan is updated and funding amounts are re-authorized by the board at least every six years. By April 1 of any year, the managing partner may notify the State that it does not intend to renew the agreement; however, in such case the partnership agreement remains in effect for the balance of the existing six-year term, and the conservation easement remains in full effect in perpetuity. The conservation easement may be revoked by the landowner only if State funding is terminated without the concurrence

of the landowner and cooperating entity. Prior to terminating funding, the State must conduct one or more public hearings. The NAP program is funded through real estate conveyance taxes which are placed in a Natural Area Reserve Fund. Participants in the NAP program must provide annual reports to the DLNR and DLNR makes annual inspections of the work in the reserve areas. See Haw. Rev. Stat. sections 195-1—195-11; Hawaii Administrative Rules section 13-210.

Management programs within the preserves are documented in long-range management plans and yearly operational plans. These plans detail management measures that protect, restore, and enhance the rare plants and their habitats within the preserves and in adjacent areas (TNCH 1997, 1998, 1999). These management measures address factors which led to the listing of the ten species including control of nonnative species of ungulates, rodents, and weeds. In addition, habitat restoration and monitoring are also included in these plans.

The primary management goals for both Kapunakea and Waikamoi Preserves are to (1) prevent degradation of native forest by reducing feral ungulate damage; (2) improve or maintain the integrity of native ecosystems in selected areas of the preserve by reducing the effects of nonnative plants; (3) increase the understanding of threats posed by small mammals and reduce their negative impact, where possible; (4) prevent extinction of rare species in the preserve; (5) track the biological and physical resources in the preserves and evaluate changes in these resources over time; (6) identify new threats to the preserves before they become established pests; and (7) build public understanding and support for the preservation of natural areas, and enlist volunteer assistance for preserve management (TNCH 1997, 1998).

The goal of the ungulate program is to bring pig populations to zero as rapidly as possible. Specific management actions to address feral ungulate impacts include the construction of fences, including strategic fencing (fences placed in proximity to natural barriers such as cliffs), annual monitoring of ungulate presence transects, and trained staff and volunteer hunting. Since axis deer may also pose a threat to the preserves, TNCH is a member of the Maui Axis Deer Group (MADG) and staff meet regularly with other MADG members to seek solutions. In Waikamoi Preserve, the management actions also include working with community hunters in

conjunction with the East Maui Watershed Partnership (EMWP). In Kapunakea Preserve, a system of transects extends the length of the preserve to monitor resource threats, including ungulate presence. By monitoring ungulate activity within the preserve, the staff is able to assess the success of the hunting program. If increased hunting pressure does not reduce feral ungulate activity in the preserves, the preserve staff work with the hunting group to identify and implement alternative methods (TNCH 1997, 1998).

The nonnative plant control program within both preserves focuses on controlling habitat-modifying nonnative plants (weeds) in intact native communities and preventing the introduction of additional non-native plants. Based on the degree of threat to native ecosystems, a weed priority list has been compiled for the preserves, and control and monitoring of the highest priority species are ongoing. Weeds are controlled manually, chemically, or through a combination of both. Preventive measures (prevention protocol) are required by all who enter the preserves. This protocol includes such things as brushing footwear before entering the preserves to remove seeds of nonnative plants. Weeds are monitored along transects annually, weed priority maps are maintained, staff participate as members of the Melastome Action Committee and the Maui Invasive Species Committee (MISC), and cooperate with the State Division of Conservation and Resources Enforcement (DOCARE) in marijuana control, as needed.

The effects of nonnative invertebrates and small mammals on native Hawaiian ecosystems are poorly understood. Initial control measures such as anti-coagulant diphacinone bait stations are being used to control rats in areas of suspected impact; however, valid conclusions from data gathered have not been drawn. Adaptive management will be applied when new information becomes available (TNCH 1997, 1998).

Natural resource monitoring and research address the need to track the biological and physical resources of the preserves and evaluate changes in these resources to guide management programs. Vegetation is monitored throughout the preserves to document long-term ecological changes, and rare plant species are monitored to assess population status. Cuttings of endangered plants are taken to the University of Hawaii's tissue culture lab at Lyon Arboretum for propagation. In addition, the preserve staff provides logistical support to scientists and

others who are conducting research within the preserves.

Kapunakea Preserve is adjacent to two areas that are also managed to protect natural resources: Puu Kukui Watershed Management Area (WMA) and the Honokowai section of the West Maui NAR. TNCH currently acts as a consultant to Maui Land and Pineapple Company, managers of Puu Kukui WMA, and has a Master Cooperative Agreement with DOFAW. These agreements are used to coordinate management and sharing of staff and equipment, and expertise to maximize management efficiency.

Waikamoi Preserve is adjacent to three other large areas that are also managed to protect natural resources: Haleakala National Park, Koolau Forest Reserve, and the State's Hanawi NAR. An agreement between the DLNR, East Maui Irrigation Company, Keola Hana Maui Inc., Haleakala Ranch Company, County of Maui, TNCH, and Haleakala National Park was signed in order to implement a joint management plan (East Maui Watershed Partnership Plan) for the entire East Maui Watershed. Management efforts at Waikamoi complement the objectives of the plan as much as possible. The partnership agreement is being used to coordinate management and sharing of staff and equipment, and expertise to maximize management efficiency (TNCH 1998).

Because the preserves and the continuing management plans being implemented for these plants and their habitats within the preserves provide a conservation benefit to the species and because they are permanently protected and managed, these lands are not in need of special management or protection. Therefore, we have determined that the private lands within Waikamoi Preserve and Kapunakea Preserve do not meet the definition of critical habitat in the Act, and we are not designating these lands as critical habitat. Should the status of any of these reserves change, for example by non-renewal of a partnership agreement or termination of NAP funding, we will reconsider whether it then meets the definition of critical habitat. If so, we have the authority to propose to amend critical habitat to include such area at that time (50 CFR 424.12(g)).

#### **Maui Land and Pineapple Co., Ltd.**

*Maui Pineapple Company's Puu Kukui WMA, Located in The West Maui Mountains*

Lands within Maui Land and Pineapple Co.'s Puu Kukui Watershed Management Area, located in the West Maui Mountains, were included in

proposed critical habitat on Maui. Eight species (*Ctenitis squamigera*, *Clermontia oblongifolia* ssp. *mauiensis*, *Cyanea lobata*, *Cyrtandra munroi*, *Hesperomannia arborescens*, *Phlegmariurus mannii*, *Platanthera holochila*, and *Sanicula purpurea*) are reported from the Puu Kukui WMA (GDSI 2000; HINHP Database 2000; Maui Land and Pineapple Co., Ltd. undated). In the December 18, 2000, proposal we proposed that lands within the Puu Kukui WMA were adequately managed for the conservation of the listed species that occur on those lands and were not in need of special management considerations or protection. Therefore, we proposed that these lands did not meet the definition of critical habitat in the Act, and we did not propose designation of these lands as critical habitat. However, during the comment periods on the December 18, 2000, proposal we received information from the Watershed Supervisor that funding for the conservation and management of the listed plant species on lands within Puu Kukui WMA was not adequate nor assured. However, during the comment periods for the April 3, 2002, proposal we received yet more information from the Watershed Supervisor that, contrary to the previous comments submitted, funding for Puu Kukui WMA was indeed secure. In his September 30, 2002, letter to us the Puu Kukui Watershed Supervisor stated that since 1988 Maui Land and Pineapple has proactively managed Puu Kukui Watershed and that they are currently in their second, six-year contract with the State of Hawaii's NAP Program to preserve the native biodiversity of their conservation lands. They are also receiving funding from the Service to survey for rare plants on their lands and build feral ungulate control fences for the protection of listed plants. In other words, they have a history of self-funding and conducting proactive conservation efforts in Puu Kukui, they are enrolled in the State's NAP Program and they receive funding from the Service to support their conservation efforts. Therefore, we have determined that the private land within Puu Kukui WMA does not meet the definition of critical habitat in the Act as discussed below, and we are not designating critical habitat on this land.

At just over 3,483 ha (8,600 ac), the Puu Kukui WMA is the largest privately owned preserve in the State. In 1993, the Puu Kukui WMA became the first private landowner participant in the NAP program. In the NAP program, Puu Kukui WMA staff are pursuing four management programs stipulated in

their Long Range Management Plan with an emphasis on reducing nonnative species that immediately threaten the management area (Maui Pineapple Company 1999).

The primary management goals within Puu Kukui WMA are to (1) eliminate ungulate activity in all Puu Kukui management units; (2) reduce the range of habitat-modifying weeds and prevent introduction of nonnative plants; (3) reduce the negative impacts of non-native invertebrates and small animals; (4) monitor and track biological and physical resources in the watershed in order to improve management understanding of the watershed's resources; and (5) prevent the extinction of rare species within the watershed.

Specific management actions to address feral ungulates include the construction of fences surrounding 10 management units and removal of ungulates within the Puu Kukui WMA.

The nonnative plant control program within Puu Kukui WMA focuses on habitat modifying weeds, prioritizing them according to the degree of threat to native ecosystems, and preventing the introduction of new weeds. The weed control program includes mapping and monitoring along established transects and manual/mechanical control. Biological control of *Clidemia hirta* was tried by releasing *Antiblemma acclinalis* moth larvae.

Natural resource monitoring and research address the need to track biological and physical resources of the Puu Kukui WMA and evaluate changes to these resources in order to guide management programs. Vegetation is monitored through permanent photo points, nonnative species are monitored along permanent transects, and rare, endemic, and indigenous species are monitored. Additionally, logistical and other support for approved research projects, interagency cooperative agreements, and remote survey trips within the watershed is provided.

For these reasons, Puu Kukui WMA meets the three criteria for determining that an area is not in need of special management as discussed above. Therefore, we have determined that the private land within Puu Kukui WMA does not meet the definition of critical habitat in the Act, and we are not designating this land as critical habitat. Should the status of this reserve change, for example by non-renewal of a partnership agreement or termination of NAP funding, we will reconsider whether it then meets the definition of critical habitat. If so, we have the authority to propose to amend critical habitat to include such area at that time (50 CFR 424.12(g)).

In summary, we believe that the habitat within Waikamoi and Kapunakea Preserves, Puu Kukui WMA, and the upper area (above 1,525 m (5,000 ft)) of Hanawi NAR, are being adequately managed for the conservation of the listed species that occur within these areas and are not in need of special management considerations or protection. Therefore, we have determined that these lands do not meet the definition of critical habitat in the Act, and we are not designating these lands as critical habitat.

#### Analysis of Impacts Under Section 4(b)(2)

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific information available, and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of exclusion outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when exclusion will result in the extinction of the species concerned.

#### Economic Impacts

Following the publication of the revised proposed critical habitat designation on April 5, 2002, a draft economic analysis (DEA) was prepared to estimate the potential economic impact of the proposed designation in accordance with the Court's decision in the *N.M. Cattlegrowers Ass'n v. U.S. Fish and Wildlife Serv.*, 248 F.3d 1277 (10th Cir. 2001). The draft analysis was made available for review on October 2, 2002 (67 FR 61845). We accepted comments on the draft analysis until November 2, 2002.

Our draft economic analysis evaluated the potential direct and indirect economic impacts of section 7 associated with the proposed critical habitat designation for the 61 plant species from the islands of Maui and Kahoolawe over the next ten years. Direct impacts are those related to consultations under section 7 of the Act. They include the cost of completing the section 7 consultation process and potential project modifications resulting from the consultation. Indirect impacts are secondary costs and benefits that could occur coextensively with critical habitat designation, but are not necessarily directly related to the Act. Examples of indirect impacts include potential effects to property values, potential effects of redistricting of land from agricultural or urban to

conservation, and social welfare benefits of ecological improvements.

The categories of potential direct and indirect costs considered in the analysis included the costs associated with: (1) Conducting section 7 consultations including incremental consultations and technical assistance; (2) Modifications to projects, activities, or land uses resulting from the section 7 consultations; (3) Uncertainty and public perceptions resulting from the designation of critical habitat including potential indirect costs resulting from the loss of hunting opportunities and the interaction of State and local laws; and (4) Potential offsetting beneficial impacts associated with critical habitat, including educational benefits. The most likely economic effects of critical habitat designation are on activities funded, authorized, or carried out by a Federal agency (*i.e.*, direct costs).

The analysis in the DEA incorporates two baselines: one which addresses the impact of critical habitat designation that may be "attributable co-extensively" to the listing of the species and one which addresses the incremental impact of the critical habitat designation itself.

This Addendum utilizes one baseline and analyzes the impacts of critical habitat designation that may be attributable co-extensively to the listing of the species. Because of the potential uncertainty about the benefits and economic costs resulting solely from critical habitat designations, the Service believes that it is reasonable to estimate the effects of the designation utilizing this approach to avoid understating potential economic impacts. It is important to note that the inclusion of impacts attributable co-extensively to the listing does not convert the economic analysis into a tool to be considered in the context of a listing decision.

The addendum incorporates public comments on the draft analysis and makes other changes in the draft. These changes were primarily the result of modifications made to the proposed critical habitat designation based on biological information received during the comment periods. In addition, we have completed an amendment to the addendum in which we have examined the potential economic impacts of a critical habitat designation in areas that were not included in the original proposal because we believed they were areas essential to the conservation of the species but did not require special management considerations or protection and thus could be excluded from designation under section 3(5)(a) of the Act.



Together, the draft economic analysis, the addendum and the addendum amendment constitute our final economic analysis. The draft economic analysis estimated the total direct cost of the designation of critical habitat on Maui and Kahoolawe for the 60 plant species co-extensive with the listing to be between \$418,700 and \$2,075,600 over 10 years. This direct cost was revised in the addendum to \$241,700 to \$1,441,200 over 10 years. The reduction of \$177,000 to \$634,400 from the costs estimated in the draft economic analysis is primarily due to the exclusion of some proposed units and the significant reduction in size of other proposed units. Using a seven percent discount rate and assuming these direct costs are distributed evenly over the 10-year period, the annualized direct costs range from \$24,170 to \$144,120 per year.

Certain costs identified in the final economic analysis are based on "worst-case" scenarios that, while possible, do not seem likely based on past consultation histories for these species. In particular, the final economic analysis includes an evaluation of potential indirect costs associated with the designation of critical habitat for 60 plant species on Maui and Kahoolawe. These reported costs are speculative and, in general, thought to have a low probability of occurrence. In addition, the final economic analysis discusses economic benefits in qualitative terms rather than providing quantitative estimates because of the lack of information available to estimate the economic benefits of endangered species preservation and ecosystem improvements.

The likely direct cost impact of designating critical habitat on Maui and Kahoolawe for the 60 plant species is estimated to be between \$24,170 to \$144,120 per year over the next 10 years. This estimate, however, includes areas that were proposed as critical habitat, but have been excluded under sections 3(5)(a) and/or 4(b)(2) of the Act. Therefore, the direct cost of designating critical habitat for these 60 plant species is likely to be somewhat less than this amount.

A more detailed discussion of our economic analysis is contained in the draft economic analysis and the addendum. Both documents are included in our administrative record and are available for inspection at the Pacific Islands Fish and Wildlife Office (see ADDRESSES section).

#### Other Impacts

As described in the "Analysis of Managed Lands Under Section 3(5)(A)" section above, based on our evaluation

of the adequacy of special management and protection that is provided in current management plans involving *Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bonamia menziesii*, *Clermontia oblongifolia* ssp. *mauiensis*, *Clermontia samuelii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea lobata*, *Cyanea mceldowneyi*, *Cyrtandra munroi*, *Diplazium molokaiense*, *Geranium arboreum*, *Geranium multiflorum*, *Hesperomannia arborescens*, *Melicope balloui*, *Phlegmariurus mannii*, *Plantago princeps*, *Platanthera holochila*, *Remya mauiensis*, and *Sanicula purpurea* in accordance with section 3(5)(A)(i) of the Act, we have not included TNCH's Waikamoi and Kapunakea Preserves, Maui Land and Pineapple's Puu Kukui WMA, and the State's upper Hanawi NAR lands, in this final designation of critical habitat. However, to the extent that special management considerations and protection may be required for these areas, and they therefore meet the definition of critical habitat according to section 3(5)(A)(i), they are properly excluded from designation under section 4(b)(2) of the Act, based on the following analysis.

In addition, approximately 3,894 ha (9,622 ac) within five proposed critical habitat units (Maui units H, I1, I2, and I4) located on private lands owned by Ulupalakua and Haleakala Ranches are excluded from designation under section 4(b)(2) because the benefits provided by these two landowners' voluntary conservation activities within and adjacent to these units outweigh the benefits provided by a designation of critical habitat.

The Service believes that designation of critical habitat on these lands would be a disincentive to those that have demonstrated a willingness to manage their lands in a manner compatible with the conservation of listed and non-listed species on Maui and Kahoolawe. Designation, therefore, would have a strong possibility of having a detrimental effect on the recovery of the listed species on these lands. The exclusion of these lands from critical habitat, on the other hand, will help improve and maintain our positive relationship with the landowners involved and it will also provide incentives to other landowners on Maui and Kahoolawe to consider implementing similar voluntary conservation activities, conservation partnerships, and beneficial natural resource programs on their lands.

TNCH's Waikamoi and Kapunakea Preserves contain occupied habitat for

13 species (*Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bonamia menziesii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea lobata*, *Diplazium molokaiense*, *Geranium arboreum*, *Geranium multiflorum*, *Plantago princeps*, *Platanthera holochila*, and *Sanicula purpurea*) and unoccupied habitat for three species (*Melicope balloui*, *Phlegmariurus mannii*, and *Remya mauiensis*). The State's upper Hanawi NAR contains occupied habitat for *Clermontia samuelii* and *Geranium multiflorum*, and unoccupied habitat for *Cyanea mceldowneyi*. Eight species (*Ctenitis squamigera*, *Clermontia oblongifolia* ssp. *mauiensis*, *Cyanea lobata*, *Cyrtandra munroi*, *Hesperomannia arborescens*, *Phlegmariurus mannii*, *Platanthera holochila*, and *Sanicula purpurea*) occur within the Maui Land and Pineapple Company's Puu Kukui WMA. For a more detailed description of the management activities conducted on TNCH's Waikamoi and Kapunakea Preserves, the State's Hanawi NAR and Maui Land and Pineapple's Puu Kukui WMA, see the "Analysis of Managed Lands Under Section 3(5)(A)" section.

The portion of proposed unit Maui H on Ulupalakua Ranch lands is occupied habitat for nine species: *Alectryon macrococcus*; *Bonamia menziesii*; *Cenchrus agrimonoides*; *Flueggea neowawraea*; *Geranium arboreum*; *Lipochaeta kamolensis*; *Melicope adscendens*; *Melicope knudsenii*; and *Melicope mucronulata*. It is unoccupied habitat for three species: *Clermontia lindseyana*; *Colubrina oppositifolia*; and *Diellia erecta*.

Ulupalakua Ranch is involved in several important voluntary conservation agreements and is currently carrying out some of these activities for the conservation of these species. For example, the Partners for Fish and Wildlife Auwahi and Puu Makua agreements were entered into in fiscal year 1997 and 1998 with the stated purpose of protecting and restoring dryland forest including construction of enclosure fences, a greenhouse, access road, and propagation and outplanting of native plants. Preservation of these areas conserves critically endangered species of plants and animals in one of Hawaii's most degraded ecosystem types (lowland dry forest). This management strategy is consistent with recovery of these species. The Auwahi agreement (Auwahi I Project) is between Ulupalakua Ranch, USGS-BRD, and the Service. The Service provided funding (\$64,388) for fence materials, plant

propagation and outplanting, and weed control, Ulupalakua Ranch provided labor and materials valued at \$18,000, and USGS-BRD provided materials and technical assistance as well as staff and volunteer labor. In the 4 ha (10 ac) Auwahi project area, Ulupalakua Ranch has built the enclosure fence, outplanted native plants grown in the greenhouse including *Alectryon macrococcus* var. *auwahiensis* and *Zanthoxylum hawaiiense*, removed the majority of nonnative alien species within the fence, and removed all ungulates. The Service provided \$31,675 through an agreement with Ulupalakua Ranch for restoration work at Puu Makua. Ulupalakua Ranch has provided in-kind labor and materials valued at \$37,055 to construct a fence around the 40-ha (100-ac) enclosure, removal of ungulates, control of nonnative plants and out-planting of native plants. The first two tasks have been completed, with weed control and out-planting ongoing.

A third voluntary partnership project undertaken in cooperation with the Ulupalakua Ranch is the Auwahi II Dryforest Restoration Project. The Service provided \$76,500 (matched by in-kind services valued at \$52,000) for this 8-ha (20-ac) restoration effort adjacent to the Auwahi I project. This project is ongoing, and will employ the same methods used at Auwahi I: construct of ungulate enclosure fence; remove ungulates; control nonnative plants; and out-plant native species (including listed species).

In addition, Ulupalakua Ranch entered a partnership with Ducks Unlimited, a private conservation organization, and the Natural Resources Conservation Service's (NRCS) Wetland Reserve Program in 2000, to create wetland complexes suitable for two endangered birds, the Hawaiian Goose, nene (*Branta sandvicensis*) and Hawaiian duck, koloa (*Anas wyvilliana*). NRCS Wetland Reserve Program (WRP) provided \$100,000 for funding and technical support to develop the wetland complex, Ducks Unlimited provided matching funds and provided full survey, design, construction management and completion of wetland development practices, and Ulupalakua Ranch provided fencing, equipment, labor or other in-kind services as required to match the WRP funds. Ducks Unlimited also conducted waterfowl monitoring at the four ponds for one full year after pond construction. In 2001, a 14 ha (35 ac) area was fenced and encompassed four constructed artificial ponds and associated upland habitat at a 1,585 m (5,200 ft) elevation site. The ponds were created to attract nene and koloa pairs to forage and nest

within the protected pond/wetland area, which totals approximately 0.4 ha (1 ac) of surface water, with 1–2 m (3–6 ft) depths filled and maintained by natural hydrology and rainfall. Nene may naturally disperse to Ulupalakua Ranch from Haleakala National Park and the few koloa now present on Maui may disperse to potential higher elevation habitat at the ranch. Normal grazing and management of pasture lands throughout Ulupalakua Ranch will also provide additional foraging areas for nene.

As endangered species are anticipated on the ranch, Ulupalakua Ranch is developing a Safe Harbor Agreement with the Service and the State through the Safe Harbor program. The Safe Harbor program encourages proactive management to benefit endangered and threatened species on non-Federal lands by providing regulatory assurances to landowners that no additional Endangered Species Act restrictions will be imposed on future land, water, or resource use for enrolled lands. The intended purpose of the ranch's Safe Harbor Agreement is to restore and enhance foraging and breeding habitat for two endangered Hawaiian waterbirds at Ulupalakua Ranch in East Maui. Under this Agreement, Ulupalakua Ranch will create a fenced 14-ha (35-ac) pond/wetland area and maintain it for 20 years. If endangered species are attracted to the area, Ulupalakua Ranch's voluntary conservation activities will contribute to recovery by increasing their reproduction, survival, and distribution on Maui.

The portion of proposed units Maui H, I1, I2, and I4 on Haleakala Ranch Company lands is occupied habitat for seven species: *Alectryon macrococcus*; *Cyanea mceldowneyi*; *Diellia erecta*; *Diplazium molokaiense*; *Geranium arboreum*; *Melicope balloui*; and *Phlegmariurus mannii*. It is unoccupied habitat for 11 species: *Argyroxiphium sandwicense* ssp. *macrocephalum*; *Asplenium fragile* var. *insulare*; *Clermontia lindseyana*; *Cyanea glabra*; *Geranium multiflorum*; *Lipochaeta kamolensis*; *Neraudia sericea*; *Phyllostegia mannii*; *Phyllostegia mollis*; *Plantago princeps*; and *Platanthera holochila*.

Haleakala Ranch Company is involved in several important voluntary conservation agreements that benefit the species included in the proposed critical habitat. For example, in the mid-1980s, Haleakala Ranch Company granted TNCH a perpetual conservation easement that included over 19,000 ha (47,000 ac) (Waikamoi Preserve) on Maui in order to protect its native forest

resources and watershed from damage caused by pigs and cattle. Haleakala Ranch Company has been working with the Central Maui Soil and Water Conservation District to address soil and resource issues. In cooperation with the NRCS Environmental Quality Incentives Program (EQIP), Haleakala Ranch Company has implemented a weed control program that has been on-going for over 80 years. Eight years ago, the Haleakala Ranch Company Directors created and filled a Land Steward position in order to shepherd the ranch's conservation efforts and update the conservation plans for all Haleakala Ranch Company lands.

In addition, the Service's Partners for Fish and Wildlife Puu Pahu agreement with Haleakala Ranch Co. and NRCS within proposed unit Maui I1 was entered into in fiscal year 2001 with the stated purpose of protecting and restoring native subalpine dry shrubland. This agreement included construction of a 6.9 km (4.3 mi) enclosure fence and removal of ungulates within the area in order to allow the already semi-intact native vegetation to regenerate. Preservation of this area conserves critically endangered species of plants and animals in one of Hawaii's most restricted ecosystem types (subalpine dry shrubland). This management strategy is consistent with the recovery of these species. The Service and NRCS provided funding for fencing materials (\$91,418 from the Service) and are providing technical assistance on the conservation of *Geranium arboreum* and restoration of the subalpine dry shrubland. Haleakala Ranch Co. is building the fence and removing the ungulates (in-kind cost-share valued at \$28,875). This work is planned for completion by August 30, 2003. Haleakala Ranch Co. has also worked with DOFAW for the past 2 years on an ungulate-free reserve for native habitat regeneration in the Waiopae area. Haleakala Ranch Co. is fencing the area to improve grazing management from the forest to the shoreline. These actions will include riparian protection to improve habitat for native plants, especially *Lipochaeta kamolensis* and *Alectryon macrococcus*, and watershed management.

According to our published recovery plans, recovery of the species addressed in this rule will require self-sustaining populations distributed across the landscape of sufficient robustness to withstand periodic threats due to natural disaster or biological threats (Service 1995a, 1995b, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2001). The highest priority recovery tasks include active management such as plant

propagation and reintroduction, fire control, nonnative species removal, and ungulate fencing. Failure to implement these management measures, all of which require voluntary landowner support and participation, virtually assures the extinction of these species. Many of these types of conservation actions in these areas of Maui are carried out as part of TNCH's, the State's, ML&P's, and Ulupalakua and Haleakala Ranch's participation in landowner incentive-based programs, and by actions taken on the landowner's initiative, as well as by actions taken on the State's prioritization and initiative, and Ulupalakua Ranch's and Haleakala Ranch's participation with the Service's Partners for Fish and Wildlife. These activities, which are described in more detail above, require substantial voluntary cooperation by each entity and other cooperating landowners and local residents.

The following analysis describes the likely conservation benefits of a critical habitat designation compared to the conservation benefits without critical habitat designation. In particular we considered: to what extent a critical habitat designation would confer additional regulatory conservation benefits on these species; to what extent the designation would provide an educational benefit to the members of the public that would lead to enhanced conservation; and whether the critical habitat designation would have a positive, neutral, or negative impact on voluntary conservation efforts on each landowner's lands as well as other non-Federal lands on Maui that could contribute to recovery.

#### (1) Benefits of Inclusion

These areas contain habitat essential to the conservation of the species listed for each area as described above. The primary direct benefit of inclusion of these lands as critical habitat would result from the requirement under section 7 of the Act that Federal agencies consult with us to ensure that any proposed Federal actions do not destroy or adversely modify critical habitat.

The benefit of a critical habitat designation would ensure that any actions authorized, funded or carried out by a Federal agency would not likely destroy or adversely modify any critical habitat. Without critical habitat, some site-specific projects might not trigger consultation requirements under the Act in areas where species are not currently present; in contrast, Federal actions in areas occupied by listed species would still require consultation under section 7 of the Act to determine

if the action is likely to jeopardize the continued existence of the listed species.

Much of the area on TNCH's lands is already occupied habitat for 13 of the 16 listed species. Therefore, any Federal activities that may affect these areas will likely require section 7 jeopardy consultation. Historically, we have conducted only one informal consultation under section 7 regarding Federal actions on TNCH's land on Maui. This consultation was conducted with the U.S. Department of Agriculture to review the effect of feral pig removal on listed endangered and threatened species within Waikamoi and Kapunakea Preserves. Thirteen of the 60 species, *Alectryon macrococcus*, *Argyroxiphium sandwicense* ssp. *macrocephalum*, *Asplenium fragile* var. *insulare*, *Bonamia menziesii*, *Colubrina oppositifolia*, *Ctenitis squamigera*, *Cyanea lobata*, *Diplazium molokaiense*, *Geranium arboreum*, *Geranium multiflorum*, *Plantago princeps*, *Platanthera holochila*, and *Sanicula purpurea*, are known to occur within the preserves.

Much of the area on State lands is already occupied habitat for two of the three listed species. Therefore, any Federal activities that may affect these areas will likely require section 7 jeopardy consultation. Historically, we have conducted one formal consultation and 16 informal consultations under section 7 on the islands of Maui and Kahoolawe for one or more of the 60 plant species. None of these consultations involved this State land.

Much of the area in the ML&P's Puu Kukui WMA is already occupied by *Ctenitis squamigera*, *Clermontia oblongifolia* ssp. *mauiensis*, *Cyanea lobata*, *Cyrtandra munroi*, *Hesperomannia arborescens*, *Phlegmariurus mannii*, *Platanthera holochila*, and *Sanicula purpurea*. Therefore, any Federal activities that may affect these areas will in all likelihood require section 7 jeopardy consultation. Historically, we have conducted one informal consultation for this property. It addressed the beneficial effects of Federal funding for ungulate exclusion on listed endangered and threatened species within the Puu Kukui Partnership Project area.

On Maui, historically we have conducted only one formal consultation and 16 informal consultations under section 7 for any of the plant species found on Maui. Of these, only two informal consultations were conducted on Ulupalakua Ranch. These were intra-Service consultations on the effects of fencing and outplanting within the Puu Makua Partnership Project area and the

Auwahi Partnership Project area (see discussion below).

We have never completed a section 7 consultation on Haleakala Ranch Company's lands (although one is in the process of being completed for the Puu Pahu project that the Service is funding in part).

As a result of the low level of previous Federal activity on these lands, and after considering the future Federal activities that might occur on these lands, it is the Service's opinion that there is likely to be a low number of future Federal activities that would adversely affect habitat on the lands described above. Therefore, we anticipate little additional regulatory benefits from including these areas in critical habitat beyond what is already provided by the existing section 7 nexus for habitat areas occupied by the listed extant species.

Another possible benefit of designating critical habitat is that the designation can educate the public regarding the potential conservation value of an area, which may contribute to conservation efforts by other parties by clearly delineating areas of high conservation value for certain species. Information about the species for which suitable habitat was identified on these lands on Maui, including other parties engaged in conservation activities, could have a positive conservation benefit for the species.

While we believe this educational outcome is important for the conservation of these species, we believe it has already been achieved through the existing management, education, and public outreach efforts carried out by land owners and their conservation partners. The Nature Conservancy of Hawaii has a well-developed public outreach infrastructure that includes magazines, newsletters, and well-publicized public events on Maui and throughout Hawaii. The State has a well-developed public outreach infrastructure that includes websites, newsletters, and well-publicized public events on Maui and throughout Hawaii. ML&P features the Puu Kukui Watershed preserve on its Web site ([http://www.maui.net/mauilnp/puu\\_kukui.html](http://www.maui.net/mauilnp/puu_kukui.html)) and the Puu Kukui Watershed department staff hold monthly volunteer weed service trips throughout the year. An annual boardwalk hike (\$1,500/person) for a dozen people is held in August/September with one free "prize" slot reserved for the student winner of an environmental essay contest from Maui County high schools (Randy Bartlett, Watershed Management Supervisor, ML&P, in litt., 2002). Through the

critical habitat designation process, the portion of unit Maui H that lies within Ulupalakua Ranch and the portion of units Maui H, I1, I2, and I4 that lie within Haleakala Ranch have been identified as essential to the conservation of 25 of the 60 Maui plant species addressed in this rule. In addition, the existing conservation activities being conducted within proposed unit Maui H that lies within Ulupalakua Ranch and the portion of proposed units Maui H, I1, I2, and I4 that lie within Haleakala Ranch, as well as other portions of each ranch, by the Service and other Federal agencies (e.g., USDA NRCS), the State, and private organizations (e.g., Ducks Unlimited) demonstrate that the public is already aware of the importance of this area for the conservation of the species located on each ranch. These examples and other media extol and explain the conservation importance of these lands and their conservation value. A final designation of critical habitat would simply affirm what is already widely accepted by Hawaii's conservationists, public agencies, and most of the public concerning the conservation value of these lands.

In sum, we believe that a critical habitat designation for listed plants on these lands on Maui would provide a relatively low level of additional regulatory conservation benefit to each of the plant species beyond what is already provided by existing section 7 consultation requirements due to the physical presence of the listed species. Any regulatory conservation benefits would accrue through the benefit associated with additional section 7 consultation associated with critical habitat. Based on a review of past consultations and consideration of the likely future activities in this specific area, there is little Federal activity expected to occur on this land that would trigger section 7 consultation. The Service also believes that a final critical habitat designation provides little additional educational benefits since the conservation value is already well known by the landowner, the State, Federal agencies, private organizations, and the public.

## (2) Benefits of Exclusion

Proactive voluntary conservation efforts are necessary to prevent the extinction and promote the recovery of these listed plant species on Maui and other Hawaiian islands (Shogren *et al.* 1999, Wilcove and Chen 1998, Wilcove *et al.* 1998). Consideration of this concern is especially important in areas where species have been extirpated and their recovery requires access and

permission for reintroduction efforts (Bean 2002, Wilcove *et al.* 1998). For example, three of the 16 species associated with Waikamoi and Kapunakea Preserve are extirpated from TNCH lands, *Cyanea mceldownei* associated with Hawaii NAR lands, three of the 12 species associated with proposed unit Maui H on Ulupalakau Ranch, and 11 of the 18 species associated with proposed units Maui H, I1, I2, and I4 on Haleakala Ranch Company are extirpated from these respective lands, and repopulation is likely not possible without human assistance and landowner cooperation. Although none of the species associated with ML&P lands are extirpated, augmentation of existing populations and establishment of new populations are also likely not possible without human assistance and landowner cooperation.

As described earlier, TNCH, the State, and ML&P have a history of entering into conservation agreements with various Federal and State agencies and other private organizations on their lands. The Nature Conservancy's mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. The State's NAR mission is to preserve and protect representative samples of the Hawaiian biological ecosystems and geological formations. One of ML&P's missions is to practice prudent stewardship of their land and water resources ensuring the protection of crucial water resources for the community, as well as the rare and endangered species of plants and animals.

To address the conservation needs of the species in a larger area, Ulupalakua Ranch has expanded their Partners for Fish and Wildlife projects with the Service, in cooperation with the State NAR program for conserving additional areas, which include the following important voluntary actions by Ulupalakua Ranch: (1) Construction of enclosure fencing around a portion of Ulupalakua Ranch and the Kanaio NAR (a portion of proposed Maui unit H) with \$50,000 provided by Service, matched by in-kind services (e.g., labor and materials) valued at \$50,000; (2) Active management of feral ungulates that are negatively impacting listed plants within the fenced areas; (3) Active management of nonnative grasses and other fire hazards, and development of fire control measures; and (4) Nursery propagation and planting of native flora, including some of the 12 species, within the fenced areas.

Haleakala Ranch Company informed the Service that they are currently devising management plans for conserving resources, which include the following important voluntary actions by Haleakala Ranch Company: (1) Construction of a 9 ha (22 ac) enclosure fence around Keokea Gulch in Kihei to reduce sedimentation on the shoreline and reef and to reduce the fire hazard in the area by using R-1 reclaimed water to irrigate a riparian buffer. construction of an enclosure fence for a dryland lava flow in the Keokea area. In cooperation with DOFAW, fence construction of an enclosure in the Waiopae area for habitat protection of native forest and riparian areas (proposed units H, I1, I2, and I4); (2) Control of feral ungulates that are negatively impacting listed plants within the fenced areas; (3) Control of nonnative grasses and other fire hazards, and development of fire control measures; and (4) Habitat protection for natural regeneration of native flora within the fenced areas.

The Service believes that each of the listed species within these areas is benefitting substantially from the landowner's proactive management actions. Voluntary management actions include a reduction in ungulate browsing and habitat conversion, a reduction in competition with nonnative weeds, a reduction in risk of fire, and the reintroduction of species currently extirpated from various areas, and for which the technical ability to propagate these species currently exists or will be developed in the near future.

The conservation benefits of critical habitat are primarily regulatory or prohibitive in nature. But on Maui, simply preventing "harmful activities" alone will not slow the extinction of listed plant species (Bean 2002). Where consistent with the discretion provided by the Act, the Service believes it is necessary to implement policies that provide positive incentives to private landowners to voluntarily conserve natural resources and that remove or reduce disincentives to conservation (Wilcove *et al.* 1998). Thus, we believe it is essential for the recovery of these species to build on continued conservation activities such as these with a proven partner, and to provide positive incentives for other private landowners on Maui who might be considering implementing voluntary conservation activities but have concerns about incurring incidental regulatory or economic impacts.

Approximately 80 percent of imperiled species in the United States occur partly or solely on private lands where the Service has little management

authority (Wilcove *et al.* 1996). In addition, recovery actions involving the reintroduction of listed species onto private lands require the voluntary cooperation of the landowner (Bean 2002, James 2002, Knight 1999, Main *et al.* 1999, Norton 2000, Shogren *et al.* 1999, Wilcove *et al.* 1998). Therefore, “a successful recovery program is highly dependent on developing working partnerships with a wide variety of entities, and the voluntary cooperation of thousands of non-Federal landowners and others is essential to accomplishing recovery for listed species” (Crouse *et al.* 2002). Because the Federal government manages relatively little land on Maui, and because large tracts of land suitable for conservation of threatened and endangered species are mostly owned by private landowners, successful recovery of listed species on Maui is especially dependent upon working partnerships and the voluntary cooperation of non-Federal landowners.

Therefore, the Service believes that excluding these lands from critical habitat will help maintain and improve our partnership relationship with these landowners by recognizing their positive contribution to conservation on Maui. It will also reduce the cost and logistical burden of unnecessary regulatory oversight. We also believe this recognition will provide other landowners with a positive incentive to undertake voluntary conservation activities on their lands, especially where there is no regulatory requirement to implement such actions.

### (3) *The Benefits of Exclusion Outweigh the Benefits of Inclusion*

Based on the above considerations, and consistent with the direction provided in section 4(b)(2) of the Act, we have determined that the benefits of excluding the following areas as critical habitat for the Maui plant species concerned that occur on these lands as described above: TNCH’s Maui preserves, the State’s Hawaii NAR, ML&P’s Kukui WMA, the Ulupalakua Ranch portion of proposed unit Maui H, and the Haleakala Ranch portion of proposed units Maui H, I1, I2, and I4.

This conclusion is based on the following factors:

(i) TNCH’s mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Therefore, all of their preserve lands are currently being managed on a voluntary basis in cooperation with the Service, State, and other private organizations to achieve important conservation goals. In the past, TNCH has cooperated with

Federal and State agencies, and private organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits.

The State’s NAR mission is to preserve and protect representative samples of the Hawaiian biological ecosystems and geological formations. Therefore, the Hanawi NAR lands are currently being managed on a proactive basis in cooperation with the Service, the National Park, and private organizations to achieve important conservation goals. In the past, the State has cooperated with Federal agencies, and private organizations to implement proactive conservation activities on their lands that have resulted in tangible conservation benefits.

One of ML&P’s missions is to practice prudent stewardship of their land and water resources ensuring the protection of crucial water resources for the community, as well as the rare and endangered species of plants and animals. Therefore, all of their Puu Kukui WMA lands are currently being managed on a voluntary basis in cooperation with the Service, State, and other private organizations to achieve important conservation goals. In the past, ML&P has cooperated with Federal and State agencies, and private organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits.

A substantial amount of the Ulupalakua Ranch portion of proposed unit Maui H are currently being managed by the landowner on a voluntary basis in cooperation with us, the State of Hawaii, and USGS–BRD to achieve important conservation goals. In the past, Ulupalakua Ranch has cooperated with us, the State, and other organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits.

A substantial amount of the Haleakala Ranch Co. portion of proposed units H, I1, I2, and I4 is currently being managed by the landowner on a voluntary basis in cooperation with us, the State of Hawaii, USGS–BRD, and TNCH to achieve important conservation goals. In the past, Haleakala Ranch has cooperated with us, the State, and other organizations to implement voluntary conservation activities on their lands that have resulted in tangible conservation benefits.

(ii) Simple regulation of “harmful activities” is not sufficient to conserve these species. Landowner cooperation and support is required to prevent the extinction and promote the recovery of

all of the listed species on Maui due to the need to implement proactive conservation actions such as ungulate management, weed control, fire suppression, plant propagation, and outplanting.

The need for TNCH’s cooperation is especially acute because 3 of the 16 reported species are not currently found on the preserves. Future conservation efforts, such as translocation of these three plant species on to these lands and expansion of the extant species, will require the cooperation of TNCH and other non-Federal landowners on Maui. Exclusion of TNCH lands from this critical habitat designation will help the Service maintain and improve this partnership by formally recognizing the positive contributions of TNCH to plant recovery, and by streamlining or reducing redundant regulatory oversight.

The need for the State’s cooperation is also especially acute because the upper Hanawi NAR is unoccupied by *Cyanea mceldowneyi*. Future conservation efforts, such as translocation of this plant species back into unoccupied habitat on this land and expansion of the extant species, will require the cooperation of the State and other non-Federal landowners on Maui. Exclusion of the State’s Hanawi NAR lands from this critical habitat designation will help the Service maintain and improve this partnership by formally recognizing the positive contributions of the State NAR to plant recovery, and by streamlining or reducing unnecessary regulatory oversight.

The need for ML&P’s cooperation is necessary because future conservation efforts, such as expansion of the extant species, will require the cooperation of ML&P and other non-Federal landowners on Maui. Exclusion of ML&P lands from this critical habitat designation will help the Service maintain and improve this partnership by formally recognizing the positive contributions of ML&P to plant recovery, and by streamlining or reducing unnecessary regulatory oversight.

The need for Ulupalakua Ranch’s cooperation is important because the proposed unit Maui H is unoccupied by 3 of the 12 species. Future conservation efforts, such as translocation of these three plant species back into unoccupied habitat on these lands, will require the cooperation of Ulupalakua Ranch.

The need for Haleakala Ranch Co.’s cooperation is especially acute because the proposed units Maui H, I1, I2, and I4 are unoccupied by 11 of the 18 species. Future conservation efforts,

such as reintroduction of these 11 plant species back into unoccupied habitat on these lands, will require the cooperation of Haleakala Ranch Co.

(iii) The Service believes the additional regulatory and educational benefits of including these lands as critical habitat are relatively small. The current partnership agreements between TNCH and many organizations, the State and many organizations, ML&P and many organizations, and current agreements between the Service and Ulupalakua Ranch and Haleakala Ranch already provide significant conservation and educational benefits.

The designation of critical habitat can serve to educate the general public as well as conservation organizations regarding the potential conservation value of an area, but this goal is already being accomplished through the identification of this area in the management plans described above and through public outreach efforts. Likewise, there will be little additional Federal regulatory benefit to the species because (a) there is a low likelihood that these proposed critical habitat units will be negatively affected to any significant degree by Federal activities requiring section 7 consultation, and (b) on land owned by TNCH, the State, Ulupalakua and Haleakala Ranches, and ML&P much of the areas are already occupied by listed species and a section 7 nexus already exists. The Service is unable to identify any other potential benefits associated with critical habitat for these proposed units.

(iv) It is documented that publicly and privately owned lands and lands owned by conservation organizations such as these, alone, are too small and poorly distributed to provide for the conservation of most listed species (Bean 2002, Crouse *et al.* 2002). Excluding these lands from critical habitat may, by way of example, provide positive social, legal, and economic incentives to other non-Federal landowners on Maui who own lands that could contribute to listed species recovery if voluntary conservation measures on these lands are implemented (Norton 2000, Main *et al.* 1999, Shogren *et al.* 1999, Wilcove and Chen 1998). As resources allow, the Service would be willing to consider future revisions or amendments to this final critical habitat rule if landowners affected by this rule develop conservation programs or partnerships (e.g., Habitat Conservation Plans, Safe Harbor Agreements, conservation agreements, etc.) on their lands that outweigh the regulatory and educational benefits of a critical habitat designation.

As described above, the overall benefits to these species of a critical habitat designation for these areas are relatively small. In contrast, we believe that this exclusion will enhance our existing partnership with each landowner and it will set a positive example and provide positive incentives to other non-Federal landowners who may be considering implementing voluntary conservation activities on their lands. There is a higher likelihood of beneficial conservation activities occurring in these and other areas of Maui without designated critical habitat than there would be with designated critical habitat in these areas. In conclusion, we find that the designation of critical habitat on the TNCH Maui preserves, the State's Hawaii upper Hanawi NAR, ML&P's Kukui WMA, the Ulupalakua Ranch portion of proposed unit Maui H, and the Haleakala Ranch portion of proposed units Maui H, I1, I2, and I4 would most likely have a negative effect on the recovery and conservation of the Maui plant species concerned. Therefore, the Service's conclusion is that the net benefits of excluding these areas from critical habitat outweigh the benefits of including these areas.

#### (4) Exclusion of This Unit Will Not Cause Extinction of the Species

In considering whether or not exclusion of the TNCH preserve lands might result in the extinction of any of the 16 reported species, the Service first considered the impacts to the five species endemic to Maui (*Argyroxiphium sandwicense* ssp. *macrocephalum*, *Geranium arboreum*, *Geranium multiflorum*, *Melicope balloui*, and *Remya mauiensis*).

For both the five endemic and the 11 "multi-island" species, it is the Service's conclusion that the TNCH's mission and management plans will provide as much or more net conservation benefits as would be provided if these preserves were designated as critical habitat. These management plans, which are described above, will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for the listed plants in these areas of Maui and increase their likelihood of recovery. Extinction for any of these species as a consequence of this exclusion is unlikely because there are no known threats in these preserves due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act. The DEA indicates that there may be future programmatic consultations. These management actions were designed to

protect and provide for the conservation of these species and will not create any threats or risks of extinction to these species. Further, these areas are already occupied by 13 of the 16 species and thereby benefit from the section 7 protections of the Act, should such an unlikely Federal threat actually materialize. The exclusion of these preserves will not increase the risk of extinction to any of these species, and it may increase the likelihood that these species will recover by encouraging other landowners to implement voluntary conservation activities as TNCH has done.

In addition, critical habitat is being designated on other areas of Maui for all five of the endemic species (9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a, Maui 9—*Geranium arboreum*—a, Maui 14—*Geranium arboreum*—b, Maui 15—*Geranium arboreum*—c, Maui 8—*Geranium multiflorum*—a, Maui 9—*Geranium multiflorum*—b, Maui 9—*Geranium multiflorum*—c, Maui 8—*Melicope balloui*—a, Maui 9—*Melicope balloui*—b, Maui 17—*Remya mauiensis*—a, Maui 17—*Remya mauiensis*—b, Maui 17—*Remya mauiensis*—c, and Maui 18—*Remya mauiensis*—d), and critical habitat has been designated elsewhere on Maui, and proposed or designated on other islands for the remaining 11 multi-island species consistent with the guidance in recovery plans. These other designations identify conservation areas for the maintenance and expansion of the existing populations and are sufficient to prevent extinction of the species concerned.

In considering whether or not exclusion of the State's upper Hanawi NAR might result in the extinction of *Clermontia samuelii*, *Cyanea mceldowneyi*, and *Geranium multiflorum* the Service considered potential impacts. For all three endemic species, it is the Service's conclusion that the State's NAR mission and management provide a significant conservation benefit. The management will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for the listed plants in this area of Maui and increase their likelihood of recovery. Extinction for any of these species as a consequence of this exclusion is unlikely because there are no known threats in the NAR due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act. Further, this area is already occupied by two of the three species and thereby benefits from the section 7 protections of the Act, should such an unlikely Federal threat actually

materialize. The exclusion of this NAR will not increase the risk of extinction to any of these species, and it may increase the likelihood these species will recover by encouraging other landowners to implement voluntary conservation activities as the State has done.

In addition, critical habitat is being designated on another area of Maui for all three endemic species (Maui 9—*Clermontia samuelii*—a, Maui 8—*Cyanea mceldowneyi*—a, Maui 8—*Geranium multiflorum*—a, Maui 9—*Geranium multiflorum*—b, and Maui 9—*Geranium multiflorum*—c). These other designations identify conservation areas for the maintenance and expansion of the existing populations.

In considering whether or not exclusion of the Puu Kukui WMA might result in the extinction of any of the eight species, the Service first considered the impacts to the Maui endemic, *Hesperomannia arborescens*.

For both the endemic *Hesperomannia arborescens* and the seven “multi-island” species, it is the Service’s conclusion that ML&P’s mission and management programs will provide as much or more net conservation benefits as would be provided if this area was designated as critical habitat. These management programs, which are described above, will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for the listed plants in these areas of Maui and increase their likelihood of recovery. Extinction for any of these species as a consequence of this exclusion is unlikely because there are no known threats in Puu Kukui WMA due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act. Further, this area is already occupied by all of the eight species and thereby benefit from the section 7 protections of the Act, should such an unlikely Federal threat actually materialize. The exclusion of Puu Kukui WMA will not increase the risk of extinction to any of these species, and it may increase the likelihood these species will recover by encouraging other landowners to implement voluntary conservation activities as ML&P has done.

In addition, critical habitat has been designated elsewhere on Maui, and proposed or designated on other islands for the remaining seven multi-island species consistent with the guidance in recovery plans. These other designations identify conservation areas for the maintenance and expansion of the existing populations.

In considering whether or not exclusion of Ulupalakua Ranch’s

proposed unit Maui H might result in the extinction of any of the 12 species, the Service first considered the impacts to the three species endemic to Maui (*Geranium arboreum*, *Lipochaeta kamolensis*, and *Melicope adscendens*), and second to the nine species known from Maui and one or more other Hawaiian islands.

For both the three endemic and the nine “multi-island” species, it is the Service’s conclusion that the partnership agreements developed by Ulupalakua Ranch and the Service will provide more net conservation benefits than would be provided by designating the portion of proposed unit Maui H as critical habitat. These agreements, which are described above, will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for the listed plants in this area of Maui and increase their likelihood of recovery. Extinction for any of these species as a consequence of this exclusion is unlikely because there are no known threats in this portion of proposed unit Maui H due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act. Implementation of the partnership agreements between the landowner and the Service and the exclusion of the portion of proposed unit Maui H have the highest likelihood of preventing extinction of these 12 species, especially the species endemic to the island of Maui.

In addition, critical habitat is being designated on another area of Maui for all three of the endemic species (Maui 9—*Geranium arboreum*—a, Maui 9—*Lipochaeta kamolensis*—a, and Maui 13—*Melicope adscendens*—a). These other designations identify conservation areas for the maintenance and expansion of the existing populations.

In considering whether or not exclusion of Haleakala Ranch Company’s portions of proposed units Maui H, I1, I2, and I4 might result in the extinction of any of the 18 species, the Service first considered the impacts to the six species endemic to Maui (*Argyroxiphium sandwicense* ssp. *macrocephalum*, *Cyanea mceldowneyi*, *Geranium arboreum*, *Geranium multiflorum*, *Lipochaeta kamolensis*, and *Melicope balloui*), and second to the 12 species known from Maui and one or more other Hawaiian islands.

For both the six endemic and the 12 “multi-island” species, it is the Service’s conclusion that the partnership agreements developed by Haleakala Ranch and the Service will provide more net conservation benefits than would be provided by designating

the portion of proposed units H, I1, I2, and I4 as critical habitat. These agreements, which are described above, will provide tangible proactive conservation benefits that will reduce the likelihood of extinction for the listed plants in this area of Maui and increase their likelihood of recovery. Extinction for any of these species as a consequence of this exclusion is unlikely because there are no known threats in these portions of proposed units Maui H, I1, I2, and I4 due to any current or reasonably anticipated Federal actions that might be regulated under section 7 of the Act. Implementation of the partnership agreements between the landowner and the Service, and the exclusion of the portion of proposed units Maui H, I1, I2, and I4, have the highest likelihood of preventing extinction of these 18 species, especially the species endemic to the island of Maui.

In addition, critical habitat is being designated on other areas of Maui for all six of the endemic species (Maui 9—*Argyroxiphium sandwicense* ssp. *macrocephalum*—a, Maui 8—*Cyanea mceldowneyi*—a, Maui 9—*Geranium arboreum*—a, Maui 14—*Geranium arboreum*—b, Maui 14—*Geranium arboreum*—c, Maui 8—*Geranium multiflorum*—a, Maui 8—*Geranium multiflorum*—b, Maui 9—*Geranium multiflorum*—c, Maui 9—*Lipochaeta kamolensis*—a, Maui 8—*Melicope balloui*—a, and Maui 8—*Melicope balloui*—b), and critical habitat has been designated elsewhere on Maui, and proposed or designated on other islands for the remaining 12 multi-island species consistent with the guidance in the recovery plans for these species. These other designations identify conservation areas for the maintenance and expansion of the existing populations.

In addition, § 195D–4 (Hawaii Revised Statutes, Endangered species and threatened species) stipulates that species determined to be endangered or threatened under the Federal ESA shall be deemed endangered or threatened under the state law. It is unlawful under the state law, with some exceptions, to “take” such species, or to possess, sell, carry or transport them. For plants, take is defined in the State statute as to “cut, collect, uproot, destroy, injure, or possess”. The statutory protections for these plants provide additional assurances that exclusion of these areas from critical habitat will not result in extinction of the species in question.

In sum, the above analysis concludes that an exclusion of these areas from final critical habitat on Maui will have a net beneficial impact with little risk of